MFZ OVITOR

CONTROL UNIT E6/2L

FOR TWO DOOR OR GATE DRIVE UNITS

USER'S MANUAL

Version 6.11

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MFZ OVITOR

1. CONTENTS

1. Contents 2

2. General safety instructions 3

3. Overview of product 3
   - *3.1. Product description 3*
   - *3.2. Structure 4*
   - *3.3. Protection of motors 4*
   - *3.4. Terminal board E6-2L 5*
   - *3.5. Program version 5*
   - *3.6. Boards CON3 and CON4 ..... 5*

4. Basic functions 6
   - *4.1. Limit switches and adjustment of limit positions 6*
   - *4.2. Automatic closing 6*
   - *4.3. Running time limiter 7*
   - *4.4. Monitoring the closing drive 7*
   - *4.5. Function of the STOP-button in automatic closing 8*
   - *4.6. Reversal delay 8*
   - *4.7. Selection of radio control for full or half opening 8*
   - *4.8. Single-button control (Impulse control) 8*

5. Safety edge 9
   - *5.1. Functioning of the safety edge 9*
   - *5.2. Testing the safety edge 9*
   - *5.3. Pneumatic/electric safety edge 9*
   - *5.4. Folding door 10*

6. Photocells 11
   - *6.1. The amplifier for a transmitter-receiver type safety photocell integrated with the electronics board 11*
   - *6.2. Testing photocells 11*
   - *6.3. Separate safety photocell E6-4, single-channel 12*
   - *6.4. Separate safety photocell EU2-4, 1-/2-channel 13*
   - *6.5. Using photocell amplifiers E6-4 and EU2-4 as opening photocells 15*

7. Installation of an extra device board equipped with an edge terminal 16

8. Warning and traffic lights 17
   - *8.1. Warning light control 17*
   - *8.2. Warning light control board E6-5-01 ..... 17*
   - *8.3. Warning light control board E6-5-05 ..... 19*
   - *8.4. E6-VLV control card for oncoming traffic light 22*

9. Accessory cards 25
   - *9.1. VPLV board E6-5-06 ..... 25*
   - *9.2. SUTI board E6-5-07 ..... 26*
   - *9.3. Board E6-5-03 for automatic closing with quittance 28*
   - *9.4. Program board E6-5-04 ..... 30*
   - *9.5. SUPU board E6-5-08 ..... 33*

10. Service and troubleshooting 34
   - *10.1. Service terminal E6-6-02/3E 34*
   - *10.2. Fault and error messages through service terminal E6-6-02/3E 35*
   - *10.3. Troubleshooting 37*
   - *10.4. LED's indicating the operating mode of the limits 37*
   - *10.5. Service 38*

11. Technical data 39

12. Declaration of incorporation of partly completed machinery 40

13. Wiring diagram of power section and limit switches Draw. no. 354L 41

14. Control circuit diagram for open and close drive voltages Draw. no. 355L 42

15. Wiring diagram of power section and limit switches Draw. no. 43

16. Regulating devices, wiring diagram Draw. no. 356L 44

17. Control board CON3 and CON4 connection diagram Draw. no. 385L 45

18. Limit switch board RK/2 connection diagram Draw. no. 353L 46

2. GENERAL SAFETY INSTRUCTIONS

Target group

Only qualified and trained electricians may connect, programme and service control units. Qualified and skilled electricians must:

- Have knowledge of the general and specific safety regulations.
- Have knowledge of the relevant electrical regulations.
- Be trained in the use and care of appropriate safety equipment and clothing.
- Be capable of recognising the dangers associated with electricity.

Instructions for installation and connection

- Before commencing electrical works, the system must be disconnected from the electricity supply. Measures must be taken that the electricity supply remains disconnected for the duration of the works.
- Local safety regulations must be observed.
- Mains cables must be laid separately from control cables.

3. OVERVIEW OF PRODUCT

3.1. PRODUCT DESCRIPTION

The control unit E6/2L is OVITOR's basic control unit for automatic twin-doors, twin-gates and similar constructions with two separate drive units controlled with their own limit switches. The control logic of the E6/2L has been implemented by software. The safety circuits are connected directly in series with the control of the motors to ensure that no function related to safety depends on the mode of the program or the electronics. In the basic version, the control of the motors takes place by contactors but special arrangements also enable other kinds of motor control, such as input through frequency inverter.

Basic version is expandable by installing peripheral device or additional function boards on to preinstalled plug-in sockets. There is a socket on the basic board for a radio receiver (24 VAC) as well as for a safety photocell board. Other extra boards are to be installed into four terminals on the processor board.

Ordinary basic settings, such as the delay of automatic closing and the duration of the running-time limiter, are done with rotary switches on the board. Certain basic matters related to the mode of operation can be set with a DIP switch on the board.

The light-emitting diodes (LED) indicating the operating mode of the peripheral devices are above the terminal block; the operating modes of the program and the processor can be observed on the LED's of the board.

Selector switch can be connected to the limit board **RK/2.** With the selector switch it is possible to choose the operation of one of the door or gate halves. The LED's indicating the operating mode of each drive unit are on the limit board **RK/2**.

3.2. STRUCTURE

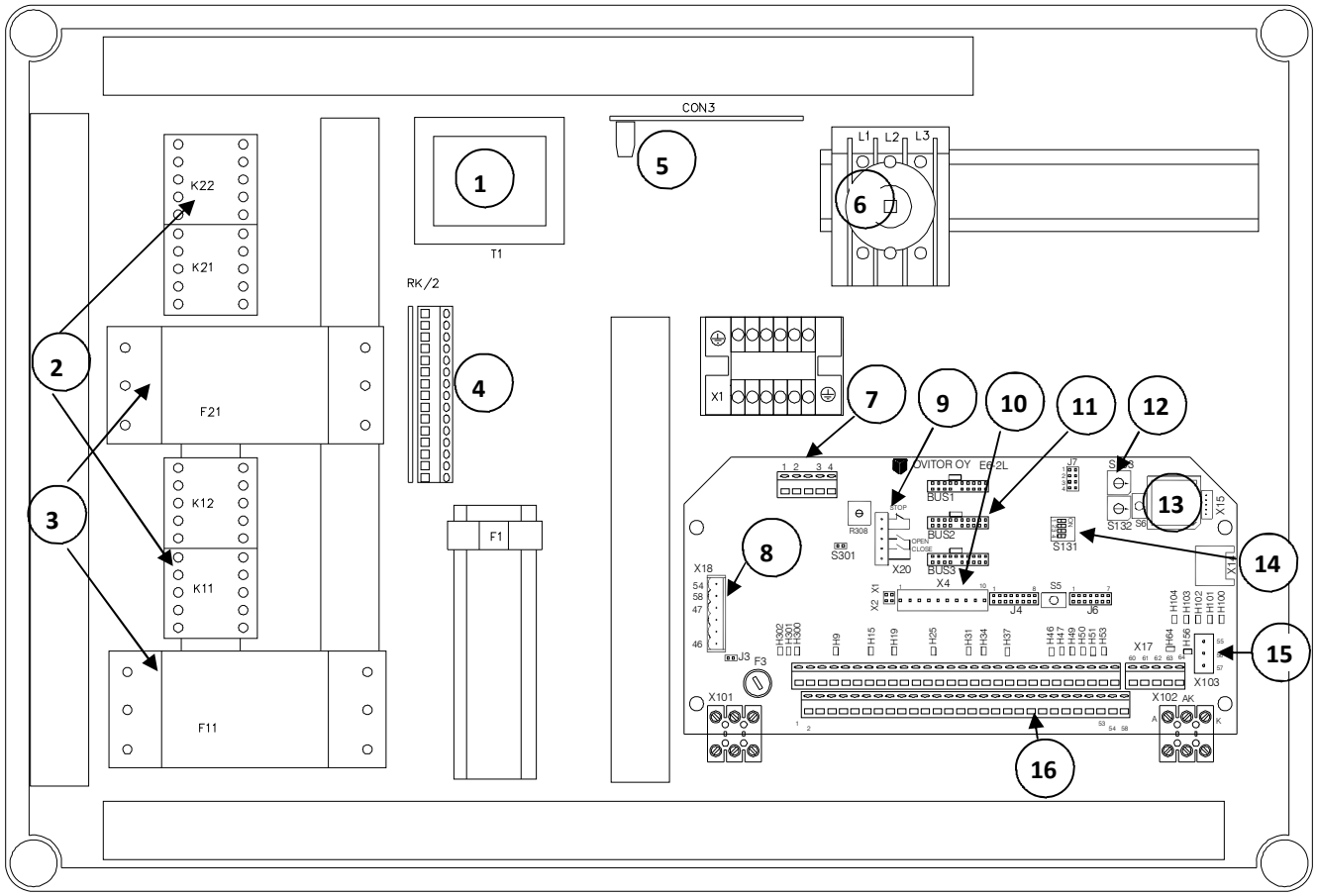


Fig. 1. Control Unit E6/2L

1. Control voltage transformer
2. Directional contactors of motors
3. Protective switches of motors
4. Limit board RK/2
5. CON3 board
6. Main switch
7. Terminal for integrated photocell transmitter and receiver
8. SEMS
9. Terminal for push-buttons in the lid
10. Socket for radio receiver
11. Bus terminals for extra device boards:
    warning light board E6-5-01
    warning light board E6-5-05
    VPLV board E6-5-06
    SUTI board E6-5-07
    board E6-5-03 for auto close with quittance
    program board E6-5-04
    SUPU board E6-5-08
    E6-VLV board
12. Rotary switches for time settings
13. Program circuit
14. DIP-switches for selecting control mode
15. Socket for safety photocell amplifier board
16. Terminals for peripheral control devices

3. OVERVIEW OF PRODUCT

3.3. PROTECTION OF MOTORS

In the control unit E6/2L the protection of motors is normally carried out with protective switches. Control voltage is being lead through the auxiliary contacts of the protective switches. For further information, see drawing no. **354L**.

3.4. TERMINAL BOARD E6-2L

The **E6-2L** board is a terminal/electronic board. Terminals for the control devices, a bayonet socket for the buttons of the lid, an integrated safety photocell amplifier, a separate safety photocell socket, an electronic safety edge control unit socket, a one-channel radio receiver socket. DIP-switches/short circuit plugs for control method selection and time-setting rotary switches are located on the board. The board also includes bus terminals for additional function boards, presented below, that can be used to make the unit more versatile.

3.5. PROGRAM VERSION

The service terminal will display a program version number, e.g. 6.00, when the unit is switched on. The user's manuals are numbered corresponding the program version. If the program version number differs from the user's manual number, the unit will not necessary perform all the operations presented in this manual. The unit's program can be updated with a memory board or computer.

The simplest method is to use a memory board, placing it in the socket**, X14**, next to the processor when disconnected from the power supply. When the unit is switched on, the program will automatically update. Updating takes a while and the LEDs, **H101... H104**, will blink. Once the updating is finished, the LEDs will stop blinking. Switch the unit off, remove the memory board and the unit will be ready for operation when you switch it on again.

3.6. BOARDS CON3 AND CON4

In special control units without power section board E6-1L, the relays **K3** and **K4** needed for peripheral functions will be substituted with a separate board **CON3** or **CON4**. Similarly, if the relays on the power section board are already in use and auxiliary functions are needed, the board CON3 or CON4 should be attached.

CON4-board is equipped with two relays K3 and K4 functioning in the same way as an additional function card controlling them should control the relays K3 and K4 on the effect board E6-1L or on the board CON3.

CON3-board is equipped with five relays **K3, K4, K5, K6** and **K7**. Relays K3 and K4 function as mentioned above. The function of relays K5, K6 and K7 is defined by the additional card controlling them. The function of additional cards is described later in this manual. The control circuit diagrams for the boards CON3 and CON4 are at the end of this manual (drawing 385L). Depending of mounting there are two versions of CON4-board, A and B. In E6 applications the only option is A.

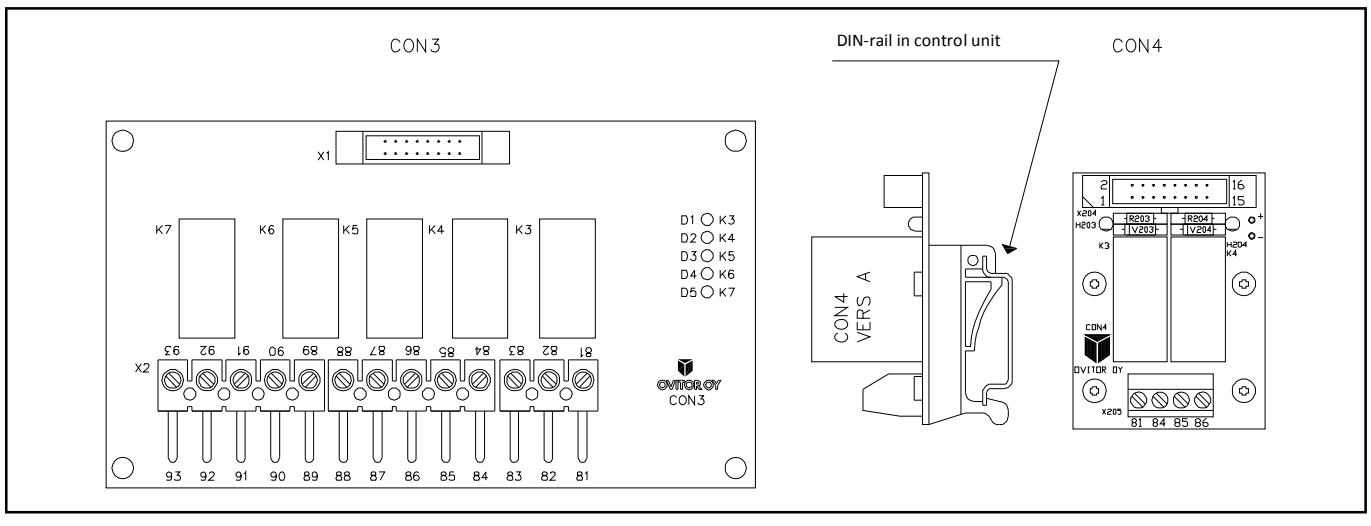


Fig. 2. Boards CON3 and CON4

4. BASIC FUNCTIONS

4.1. LIMIT SWITHCES AND ADJUSTMENT OF DOOR STOPPING LOCATIONS

Control units E6/2L controls two drive units, with mechanical limit switches. Normal applications need 3 limit switches: open limit, closed limit and the safety device limit. Contacts of the open or closed limits open when the door reaches open or closed position. The contact of the safety device limit close 5-50 mm before closed position of the door. While the contact of safety device limit is closed, the door stops without reversing when safety edge hits the floor or frame.

The stopping function can be eliminated in cases of a folding door equipped with safety edge in both colliding front edges of the door.

The operating mode of the limit switches of both drive units are indicated by LED's **H49-H51** and **H53**, cf. drawing no. **355L**. The operating mode of the limit switches of each door half are indicated by LED's **H3-H6** on the limit board **RK/2**, cf. drawing no. **354L**. Position of the limit switches in the drawings is represented corresponding the closed position of doors. The function of LEDs indicating the common mode of operation is also dependent of the mode of regulating devices connected in series before these LEDs.

Adjustment of limits is easiest while the control is set to hold-to-run (a deadman) mode.

Control unit is set to hold-to-run mode:

Opening direction: Jumper no. 2 **(ON)** of terminal **J6**

Closing direction: Jumper no. 3 **(ON)** of terminal **J6**.

Remove plugs when limits have been set.

4.2. AUTOMATIC CLOSING

Door or similar can close automatically from the fully or half-open position. Selector switch to control automatic closing is connected to terminals **12** and **13**. While switches contacts are closed, the auto closing is **ON**. If contacts are open, the auto closing is **OFF** (see drawing no. 337L). Jumpers no. 2 and 3 of terminal **J7** controls the automatic closing options.

Automatic closing from:

J7 Position	Jumper no. 2	Jumper no. 3
Fully open	ON	OFF
Half open	OFF	ON
Both	ON(OFF)	ON(OFF)

Operation with automatic closing is not permitted without sufficient safety devices

The time before the door starts to close (delay time) is set with rotary switch **S133** and with terminal **J4** jumper no. 8**.** The time is determined according to the table below. If the controller is equipped with the service terminal E6-6-02/3E, the display shows, while the rotary switch is being turned, the text "*A8D*" and after that the set time

S133 POSITION	Delay time [s] J4 jumper no. 8 OFF	Delay time [s] J4 jumper no. 8 ON	S133 POSITION	Delay time [s] J4 jumper no. 8 OFF	Delay time [s] J4 jumper no. 8 ON
0	No auto close	90	8	15	500
1	1	120	9	17	600
2	3	180	A	20	800
3	5	240	B	25	1000
4	6	280	C	30	1500
5	8	320	D	40	2000
6	10	360	E	50	3000
7	12	400	F	60	3600

4.3. RUNNING TIME LIMITER

The control unit E6/2L has, as a safety device, a running time limiter that stops the motor after the expiry of the running time required for a normal opening and closing motion. The permitted running time is set at the installation of the door, by the rotary switch **S132** in the upper right corner of board E6-2L; cf. drawing no. **340L**. The running time is determined according to the following table, by the position of the rotary switch. The permitted running time is set at 2...10 s longer than the running time required for the normal travel of the door. If the controller is equipped with service terminal E6-6-02/3E, the display shows, when the position of the rotary switch is changed, for a moment the text '*A130*' and after that the set time.

If the set continuous running time of the motor is exceeded, the red LED **H103** is lit and the door stops. If the controller is equipped with service terminal E6-6-02/3E, then while the LED H103 is lit, the display shows the text '*E9*'. This can happen, for example, when the slipping clutch of the drive unit slips after the force required by the door has surpassed the set value. The red LED is situated on the CPU board E6-2L, cf. drawing no. 340L. The fault indication disappears, and the LED turns off, when the door is again driven in the opening or closing direction. If the running time limiter stops the door again, BEFORE driving the door in either direction, check that:

- the door can freely move in its guide tracks from one end position to the other;
- there are no foreign objects between the hinges, sections, etc. of the door;
- the door has not frozen immobile;
- nothing else is preventing the normal movement of the door;
- the door has not been set on manual use with the release lever of the drive unit.

If everything is in order, drive the door in the opening or closing direction from one end position to the other, observing the door movement throughout the travel. If the fault indication is repeated, the resistance against motion of the door has for some reason increased, and/or the slipping clutch working as safety device of the drive unit is slipping. The time can be set a little longer, but it is also important to find out the reason why the set travelling time has increased.

S132 position	Max running time [s]	S132 position	Max running time [s]
0	5	8	60
1	7	9	70
2	10	A	80
3	15	B	90
4	20	C	100
5	30	D	120
6	40	E	180
7	50	F	300

4.4. MONITORING THE CLOSING DRIVE

In case the close button gets stuck, the control has been equipped with closing drive monitoring. If the close button sends a constant closing impulse while the door is opening, the door will not close immediately from the open position, but the control will require either a new closing impulse in order to close or it only closes after the stay open time set for automatic closing.

4.5. FUNCTION OF THE 'STOP' BUTTON IN AUTOMATIC CLOSING

The time count for automatic closing will start all-over again, if STOP button, connected to terminals **38 - 39** or **40 - 41** or **42 - 43** or **44 - 45**, is being pressed while the door stands in its open position. As the button is released, the door closes automatically after the set time. If the stop button connected to these connectors or the cover's stop button is pressed for more than 5 seconds when the door is open, the door will not close automatically but stay open. The door can be closed again with the close button, which resets the automatic closing function.

If the STOP button connected to terminals **34 - 35** or **36 - 37** is being pressed, the sequence for automatic closing does not start, but the door stays open. The situation is cleared by pressing the close button, upon which the door closes and functions normally again, so that the next time it closes automatically from the open position. Normally, the safety micro-switch of the manual use disengagement lever, the slack cable switch or a similar safety device is connected to terminals 34 - 35 and 36 - 37. When the function of such a safety device returns, automatic closing could cause a danger situation. When using a program board as an extra device, the functioning of all stop buttons can be set to stop automatic closing.

4.6. REVERSAL DELAY

If the door receives an open impulse while it is closing, it stops and opens after a short delay. The reversal delay aims at reducing strains on the door, drive unit and fixations. If, however, the open impulse comes from the safety edge as the door collides with an obstacle, the door opens immediately without delay. For safety reasons, no delay can be permitted in a collision situation.

4.7. SELECTION OF RADIO CONTROL FOR FULL OR HALF OPENING

The radio control on the terminal board E6-2L of the control unit E6/2L can be selected to open the door either to full opening, or to reduced opening. The selection is done by placing the jumper situated next to the radio socket into the position corresponding to the desired function. In the position **X1** the radio control will open the door into full opening and in the position **X2** into reduced opening, see drawings no. **340L** and **337L** at the end part of this manual. The position of the jumper is to be changed only when **the board is voltage free**. The changing is practically done with thin pointed pliers.

4.8. SINGLE-BUTTON CONTROL (IMPULSE CONTROL)

The control devices of single-button control are connected to terminals **22...33** according to drawing 337L. The programming of single-button control is done with the DIP switch **S131** situated in the upper right corner of board E6-2L and using short circuit plug no. 1 of terminal **J7**, cf. drawing no. 356L.

Single-button closing is set by turning switch no. 1 of **S131** into the position ON. Now the single-button control closes the door from the open position and opens the door from all other positions. If switch no. 1 is turned into the position OFF, single-button control simply opens the door. If a vehicle detector amplifier, for instance, is connected to the single-button control, the switch is kept in the position OFF. Single-button stopping is set with switch no. 2 of S131. In the position ON of switch no. 2, single-button control always stops a moving door at the first pulse and opens it at the second, that is, a closing door stops at the first pulse and opens at the second. An opening door stops at the first pulse and reopens at the second. By selecting the position OFF for switch no. 2, a pulse from the single-button control opens a closing door immediately, without a stopping function in the opening direction. The switch is kept in the position OFF if, for instance, a vehicle detector amplifier is connected to the single-button control.

Single-button closing from other than the open position will be defined by the short circuit plug no. 1 in terminal J7. In that case the DIP switches 1 and 2 must be in ON position. The short circuit plug no. 1 being in place the door, stopped when moving in open direction, starts to close at the first impulse. The next impulse stops the door and the next one opens it again. ***The operation is not allowed if it can cause a safety risk.***

5. SAFETY EDGE

5.1. FUNCTIONING OF THE SAFETY EDGE

If a pulse is received from the safety edge while the door is in closing movement between the open limit and the safety device limit, the red LED **H102** on board E6-2L lights up; cf. drawing no. 340L. Immediately after the safety edge pulse the door will open. If automatic closing has been set in the control, the latter probes with the safety edge for the removal of the obstacle in front of the door edge. The controller tries to close the door, and if a pulse comes indicating collision against the safety edge, the door will reopen. The control tries ten times for the removal of the obstacle, and if the obstacle has not disappeared from front of the door, the door will remain open. The first testing will take place after the time set for delay before self-clearance delay, and if that is not in use, after 60 s. The second testing takes place after double that time, the third after triple, etc. When using the program board as an extra device, the testing function can be eliminated, so that the door remains open after the safety edge pulse and will not close automatically. In this case the red LED H102 remains on. The LED goes out and the door closes when it is driven with the close button.

5.2. TESTING THE SAFETY EDGE

The most important safety device of moving doors is a safety edge in the colliding edge of the door. A pneumatic safety edge is the one most commonly used. The control unit E6/2L is equipped with a safety edge testing function. The controller tests the functioning of the safety edge every time the door closes tightly against the floor, the frame or a similar obstacle.

If the test pulse of the safety edge misses, the red LED **H104** on board E6-2L lights up, and the control switches over to hold-to-run in the closing direction, cf. drawing no. 356L. If the control is equipped with service terminal E6-6-02/3E, the display shows the text '*E5*' while H104 is on. The LED H104 goes off, when a pulse comes from the safety edge.

The functioning of the safety edge testing can be observed by detaching the pressure hose coming from the safety edge to the pressure switch and after this driving the door into the closed position. After the door stops in the closed position, the red LED H104 must light up. If the LED does not light up, either the testing of the safety edge has been programmed off or pressure switch still gives pulse because of vibration. The pulse from the safety edge can be observed from the green LED **H47** going out, cf. drawing no. 336L. The eye does not catch the very short pulse which the logic, however, recognises. In addition, whenever a pulse comes from the safety edge while the door is closing between the open limit and safety device limit, the red LED **H102** on the board E6-2L lights up according to section FUNCTIONING OF THE SAFETY EDGE, cf. drawing no. 340L. If necessary, terminals 46 and 47 of the safety edge can be short-circuited during control of the testing, cf. drawing no. 336L. The control of this test function must be done with great care, as the door is at that time being driven without any safety function.

In cases where there are no safety edges or they do not hit anything, e.g. with traffic barriers, the safety edge testing function can be programmed off. The elimination of the safety edge testing is done with the DIP switch S131 situated in the upper right corner of board E6-2L, cf. drawing no. 340L. Turning switch no. 3 of **S131** into the position OFF cancels the safety edge testing. In the position ON of switch 3, the safety edge testing is on. If the controller is equipped with service terminal E6-6-02/3E, the display shows, when the position of the switch is changed, for a short moment the text '*L60*' and after that 'OFF' or 'ON' according to the position of the switch.

5.3. PNEUMATIC/ELECTRONIC SAFETY EDGE

Control unit E6L can be equipped with a pneumatic and/or electronic safety edge. The pneumatic safety edge is used when its condition can be monitored in accordance with the section, "*5.2. Testing of safety edge*." The pneumatic safety edge is connected to terminals **46** and **47**. If the safety edge is not used, the connectors must be short circuited with each other.

The electronic safety edge is used when there is no test pulse from the safety edge when the door is closed, e.g. sliding and folding doors. To control the condition, the electronic safety edge requires a separate monitoring unit **SEM2** which is installed using connector **X18** on the left edge of the E6-2L board. In addition to the monitoring unit, the control system's own safety edge testing can be used. If the electronic safety edge emits a pulse when it touches the floor or the equivalent, the door's control system will test the pulse from the safety edge. In this way, the safety edge operation is double-monitored. If the electronic safety edge is not used, the pins of the terminal, **J3**, next to the socket must be short circuited with a plug.

5. SAFETY EDGE

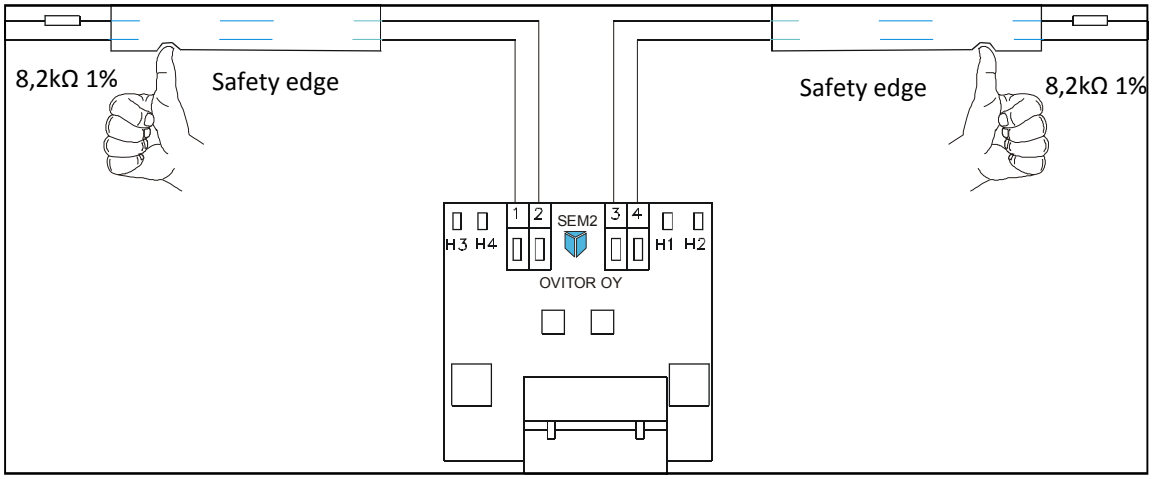


Fig. 3. SEM2. Connection of electronic safety edge.

Since SEM2 has 2 channels, it can be used for the indication of one or two electronic safety edges' obstacle recognition and the malfunction indication for the safety edge or its cabling. The sensors connected to SEM2 must have an 8.2 kΩ terminal resistor. With the help of the idle current that runs through the terminal resistor, the SEM2 can indicate a possible sensor circuit disconnection or malfunction. Always make sure that the terminal resistor is installed on the final end of the safety edge. You can also connect several safety edges in series but the last safety edge in the series must be connected with an 8.2 kΩ terminal resistor. When connecting safety edges, please note that the circuit resistance of the used cables must be no more than 100Ω.

SEM2 has two separate, identical supervising circuits for monitoring safety edge status. Both circuits monitor both safety edges. If one supervising circuit breaks a single or several components, the other circuit can indicate the obstacle recognition or malfunction of both safety edges. When the SEM2 monitoring unit is used for only one electronic safety edge, the other safety edge must be connected with an 8.2 kΩ 1 % resistor. In normal deliveries, the resistor is ready-connected with both connectors and the single safety edge is connected in accordance with the figure. If there is only one safety edge, SEM2 monitors it using both supervising circuits.

When the amplifier unit is connected to the supply voltage and safety edges and their cabling is undamaged, no LEDs will be on in the monitoring unit and the circuit of the control unit will be unbroken. Only the **H47** LED, indicating an unbroken circuit, will be switched on in the door's board, E6-2L. When the safety edge meets an obstacle or the resistance of the edge circuit drops, the yellow LEDs **H1** and **H3**, will turn on in the monitoring unit, the control system's circuit will disconnect and the LED H47, will switch off. If the safety edge circuit is disconnected or its resistance increases, the red LEDs, **H2** and **H4**, will switch on in the monitoring unit, the control system's circuit will disconnect and the LED H47, will switch off.

Monitoring unit is malfunctioned, if only one of the LEDs H1, H2, H3 or H4 is switched on. The control system's circuit will then disconnect and the LED H47, will switch off. In such a case, the monitoring unit must be replaced. The operation of the safety edge system and the monitoring unit must be checked regularly, for example whenever the door is serviced. When the safety edge gives a pulse e.g. due to contact with a hand, the door's control system must react according to the selected operating mode. When the other safety edge cable is disconnected, the door's control system must react according to the selected operating mode. The door and monitoring unit may only be serviced by an authorised service technician.

5.4. FOLDING DOOR

If the controlled door is a folding door with safety edges in the colliding edges hitting each other before the folds of the door have straightened out into the full closed position, the stopping effect of the safety edge must be programmed off. The elimination is done with the DIP switch **S131** situated in the upper right corner of board E6-2L, cf. drawing no. 356L. Turning switch no. 4 of S131 into the position ON by-passes the safety edges electrically at the functioning zone of the safety device limit switch. If the safety edges do not hit each other, the switch is left in the position OFF. If the controller is equipped with service terminal E6-6-02/3E, the display shows, when the position of the switch is changed, for a moment the text '*L50*' and after that 'OFF' or 'ON' according to the position of the switch.

6. PHOTO CELLS

6.1. THE AMPLIFIER FOR A TRANSMITTER -RECEIVER TYPE SAFETY PHOTOCELL INTEGRATED WITH THE ELECTRONICS BOARD

An amplifier for a transmitter-receiver type safety photocell is integrated with electronics board E6-2L. The amplifier, a trimmer for amplifier adjustment and transmitter and receiver terminals are located on the left, upper corner of the board. The transmitter and receiver are connected according to the following figure 4. Left connector **1** and **2** of the connector are installed with the transmitter (LT), the red signal cable to connector **1** and the black signal cable to connector **2**. The right side connectors of the connector are connected with the receiver (LR), the sheath or black cable to connector **3** and the yellow signal cable to connector **4**. NOTE! The connector has five connectors and the middle one is left empty.

The photocell amplifier is tuned as follows:

- S301 **ON** (pins short circuited with a plug): wide doorway (greater amplification)
- S301 **OFF** (with out a short circuit plug): narrow doorway (lesser amplification)R308: adjustment of amplification.
- H300 (green): lights up when the amplification is adjusted to sufficient magnitude with the R308 and the light beam is intact.
- H301 (green): lights up when the amplifier has operating voltage.
- H302 (green): goes out when the photocell amplifier's contact opens.

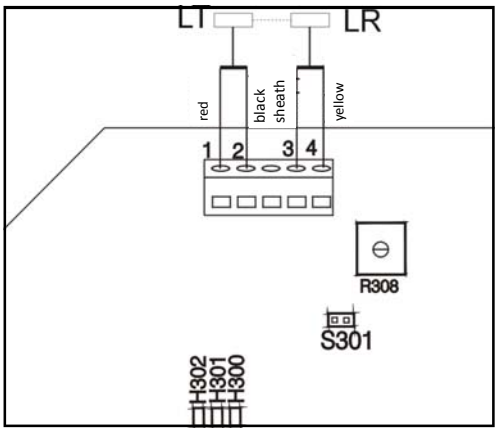


Fig. 4.

The LEDs are located above the extra device terminals on the left edge of the connector.

The correct adjustment of the photocell amplifier is performed at the installation site by testing whether the photocell functions reliably. The amplification may not be set too weak nor too strong.

The receiver should be installed on the shadier side, out of direct sunlight.

If lengthening of either transmitter or receiver cables is necessary, the transmitter cable should generally be the one to be lengthened. The transmitter and receiver conductors should not run inside the same cable sheath. If this must be done, the cable must be of the double-protected type. From the operational point of view, the most reliable way is to install a protected cable for each.

The simplest way to align the transmitter and the receiver is to connect a microammeter in series with the receiver in the AC band. The transmitter and the receiver are adjusted optimally when the current shown by the meter is at the peak.

If an integrated photocell is not used, short circuit plug No. **4** of terminal **J6** must be connected.

6.2. TESTING PHOTOCELLS

One of the features of control unit E6/2L comprises the testing of the closing safety photocell operation. The safety photocell is tested whenever the door opens. With an integrated photocell, photocell testing is performed by disconnecting the transmitter voltage that corresponds to the disconnection of the photocell beam. LED H56 indicates testing operation by going off while door is opening. If the LED does not go off because of malfunction or the safety circuit in the closed direction doesn't disconnect, the control changes to hand held in closed direction. LED **H104** blinks rapidly simultaneously. Service terminal, if present, displays the error code "*E 30*". The error alarm disappears when the photocell testing is successful. IF no photocell test is performed, short circuit plug No. 6 of terminal **J6** must be connected. Safety photocell operation must be checked during each servicing or at least once a year..

6. PHOTOCELLS

In addition to the integrated photocell, the E6-2L board has a separate socket, X103, which can be connected in series with other outside photocells, for example a separate single channel E6-4 or a separate two-channel EU2-4 or a separate mirror photocell. When connecting a mirror photocell, you need a separate screw terminal pushed into connectors 55 and 56 of connector **X103**. The electronics zero for the mirror photocell can be acquired from connector 58. If a separate photocell is not used, connectors 55 and 56 of connector X103 must be installed with a two-part screw terminal whose connectors must be short circuited with each other.

6.3. SEPARATE SAFETY PHOTOCELL E6-4, SINGLE-CHANNEL

The separate safety photocell amplifier board E6-4 is installed into the plug-in socket X103 in the right edge of board E6-2L, cf. drawing no. 340L. If a terminal block with a jumper has been installed in socket X103, the terminal block is first removed by pulling out, and then terminal **X303** of the photocell amplifier board is pushed into socket X103 so deep that its claws get into perfect grip with the corresponding clamp step of the X103. Installed in a normal way, the board only fits in one position. The component side of the board faces the E6-2L side of the CPU board. The transmitter and the receiver are installed on the amplifier board according to the wiring diagram. The receiver (LR) is mounted on terminal X301, the sheath on to pin 1 and the signal conductor (yellow) on to pin 2.

The transmitter (LT) is connected to the terminal X302, the signal conductor (red) on to pin 1 and the sheath or the black conductor on to pin 2. NOTE! The order of pins is from right to left. If another type of photocell is used, it is installed according to the wiring diagram and the instruction of drawing no. 340L.

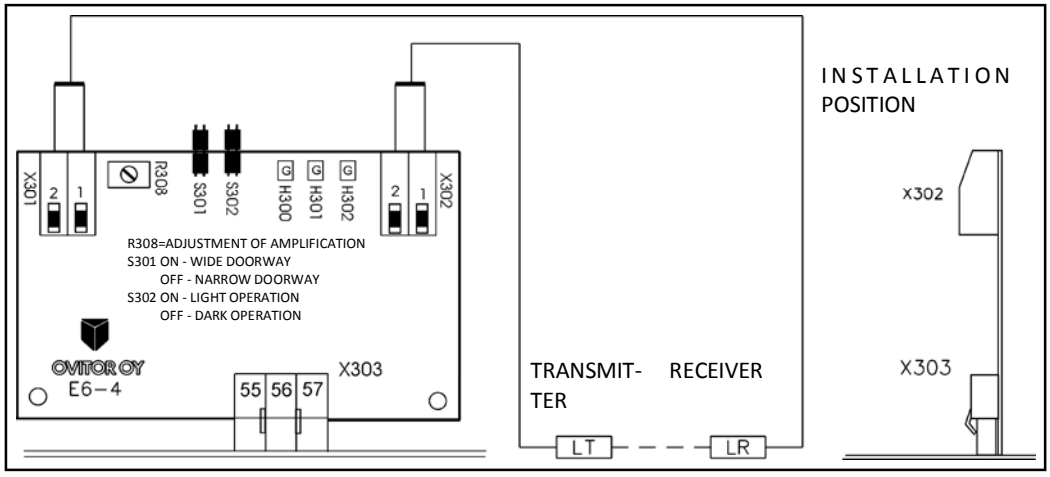


Fig. 5. E6-4 photocell amplifier

Photocell amplifier E6-4 is tuned up as follows (cf. figure 5):

- **S301** ON (pins short-circuited with a plug): wide doorway (greater amplification);
- **S301** OFF (without a short circuit plug): narrow doorway (smaller amplification);
- **S302** ON (pins short-circuited with a plug): the photocell amplifier switched off when the photocell beam is broken, so-called light operation. The S302 is to be switched in the ON position in case of a safety photocell;
- **S302** OFF (without short circuit plug): photocell amplifier is switched off when the photocell beam is NOT broken ; so-called dark operation. The S302 is connected in the OFF position when the amplifier is used e.g. as an opening photocell in a separate socket FC2;
- **R308**: adjustment of amplification;
- **H300** (green): lights up when the amplification is adjusted sufficiently great with the R308 and when the light beam is intact;
- **H301** (green): lights up when the photocell amplifier has got operating voltage;
- **H302** (green): goes out when the photocell amplifier contact opens

The correct adjustment of the photocell amplifier is done at the place of installation by testing a reliable functioning for the photocell.

- The amplification may not be set too weak nor too strong.
- The receiver should be installed on the shadier side so that sunlight does not shine on it directly.
- If it is necessary to lengthen the cables of the transmitter or the receiver of the photocell, the cable of the transmitter should generally be lengthened. The transmitter and receiver conductors should not run inside the same cable sheath. If this must be done, the cable must be of double-protected type. From the point of view of operation, the most reliable way is to install for both their own protected cable.
- The alignment of the transmitter and the receiver is most simply done so that a microampere-meter is connected in series with the receiver in the AC band. The transmitter and the receiver are adjusted so that the current shown by the meter is as great as possible, thus indicating the optimum alignment.

6.4. SEPARATE SAFETY PHOTOCELL EU2-4, 1 OR 2 CHANNELS

The safety photocell EU2-4 is directly suitable for the control unit E6L. The amplifier board will operate in 1 or 2 channel mode depending of the position of the short circuit plug **1CH/2CH**. The middle pin of the 3-pin terminal is connected to pin 1CH (1 channel) or to pin 2CH (2 channels). In 1 channel mode the transmitter is connected to terminals **T1** and **GND**, the receiver to terminals **R1** and **GND**. In 1 channel mode the level indicating LED **CH2** is not on.

The selection between light and dark operation mode is made by the short circuit plug **DRK/LGT**. The middle pin of the 3-pin terminal is connected to pin DRK (dark) or to pin LGT (light) according to the operation in use. In case of safety photocell the connection is light.

The type of the transmitter of safety photocell EU2-4 is LT01-WS-15M, the type of receiver is LR02-WS-15M. The transmitter LT-WS-15M and the receiver LR-WS-15M of the previous photocell types E6-4, PA-series and MPA-series, are not directly suitable to use with EU2-4 transmitters and receivers, but they must always be used as their own pair. When using transmitters and receivers of the previous photocell types in the new amplifier EU2-4 , in order to work, they must be used as their own pair. When using new transmitters and receivers with an amplifier of previous types, please contact OVITOR OY.

The safety photocell amplifier board EU2-4 is installed into the plug-in socket **X103** in the right edge of board E6-2; see illustration 1. If a terminal block with a jumper has been installed in socket X103, the terminal block is first removed by pulling it out, and then terminal J1 of the photocell amplifier board is pushed into socket X103 so deep that its claws get into perfect grip with the corresponding clamp step of the X103. Installed in a normal way, the board only fits in one position. The component side of board EU2-4 faces the component side of the E6-2L board. The transmitter and the receiver of the photocell are connected on the amplifier board according to the wiring diagram and illustration 6. The opening photocell amplifier board is mounted on a separate socket **FC2**.

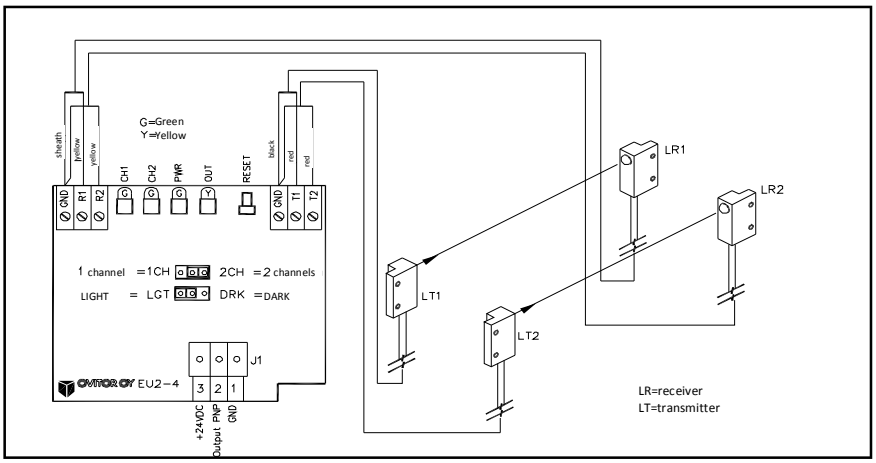


Fig. 6. Photocell amplifier EU2-4

6. PHOTOCELLS

LED's FUNCTIONING IN LIGHT OPERATION MODE

LED	Colour	On	Off	Flashing slowly	Flashing continuously	Flashing quickly
Level LED CH1	Green	Beam 1 solid	Beam 1 broken	Tuning	Amplification at max	Extraneous disturbance
Level LED CH2	Green	Beam 2 solid	Beam 2 broken	Tuning	Amplification at max	Extraneous disturbance
Operation voltage PWR	Green	In order	Missing	Faulty amplifier	Faulty amplifier	Faulty amplifier
Output OUT	Yellow	Beams solid	Beam broken or extraneous disturbance	Swinging obstacle breaks the beam	Swinging obstacle breaks the beam	Swinging obstacle breaks the beam

Photocell amplifier EU2-4 is tuned up automatically when the alignments of transmitters and receivers are correct and the amplifier operating voltage will be switched on, or the **RESET** button on the board will be pushed. When switching power on, the green LED **PWR** in the amplifier lights up, and if transmitters and receivers are correctly aligned, also the yellow LED **OUT** lights up indicating beam unity. Simultaneously the operation level indicating green LED's **CH1** and **CH2** flash slowly and after a while keep on lighting constantly. If the level indicating green LED's continuously flash slowly, the photocell amplification is at maximum range. The reason for that is normally a wrong alignment of transmitters and receivers and it must be checked. If the level indicating green LED's flash quickly, the receivers are influenced by a severe extraneous disturbance. In that case the yellow LED OUT goes out.

- When using two channels the both transmitters must be on the same side, see figure 6.
- The receivers should be installed on the shadier side so that sunlight does not shine on them directly.
- If it is necessary to lengthen the cables of the transmitters or the receivers of the photocells, it is the cables of the transmitters which generally should be lengthened. The transmitter and receiver conductors should not run inside the same cable sheath. If this must be done, the cable must be of double-protected type. From the point of view of operation, the most reliable way is to install for all of them their own protected cable.
- The alignment of the transmitter and the receiver is most simply done by connecting a microammeter in series with the receiver in the AC band. The transmitter and the receiver are adjusted so that the current shown by the meter is as great as possible, thus indicating the optimum alignment.
- The functioning of photocell is best tested by breaking for instance with a hand the beam and looking at the same time if the channel level LED goes out. When closing the door must stop and open when the photocell works.

6.5. USING PHOTOCELL AMPLIFIERS E6-4 AND EU2-4 AS OPENING PHOTOCELLS

Photocell amplifiers **E6-4** and **EU2-4** can also be used as opening photocells, in which case the amplifier is in the so-called dark operation mode. The selection of the dark operation mode is done with the short-circuit plug on the amplifier boards, as has been explained in the safety photocell instructions above. The installation and wiring of the photocell transmitters and receivers are the same as in safety photocell operation. In opening photocell operation, the amplifier is installed in the separate amplifier base **FC2**, installed with Din-rail, in accordance with figure 7, NOT in the safety photocell base **X103** preinstalled on the circuit board.

The terminals on the amplifier base are connected to the desired opening terminals. When making the wiring, remember the correct direction of current on the amplifier board. The voltage to be controlled is input on the amplifier base to terminal **255**, and the controlling voltage is output from terminal **256**. The zero potential of electronics is connected to terminal **257**. When required, the direction of current must be checked in the diagram of the inner grouping of control devices, in the final section of the manual concerned. Below, there is an option for the wiring of the amplifier base of the opening photocell (figure 8).

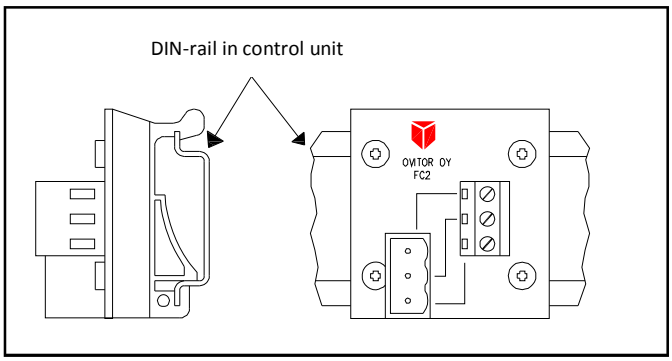


Fig. 7. Amplifier base FC2

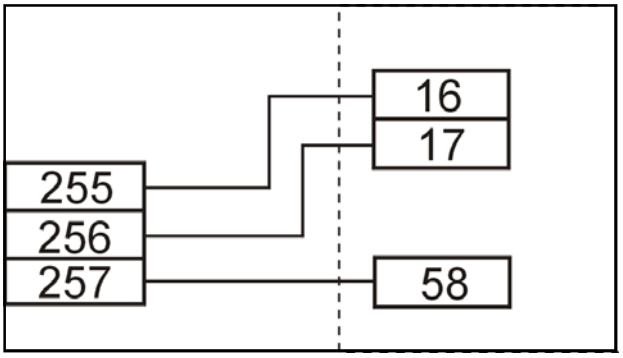


Fig. 8. Wiring of the amplifier base FC2

The amplifier base FC2 can also be utilised when separate idle current safety devices are connected in series, such as a safety photocell and a vehicle detector. It must be remembered in serial connection that the photocell amplifier is first in it and the relay output of the vehicle detector after it. Terminal 255 of amplifier board FC2 is connected to screw terminal **55** added to the base of the safety photocell of the central board. Terminal 256 of amplifier board FC2 is connected to one pole of the opening contact of the relay output of the vehicle detector. The other pole of the opening contact of the relay output of the vehicle detector is connected to screw terminal **56** added to the base of the safety photocell of the central board. Terminal 257 of amplifier board FC2 is connected to a terminal in zero potential of the central board.

7. INSTALLATION OF AN EXTRA DEVICE BOARD EQUIPPED WITH AN EDGE TERMINAL

The edge terminal of the extra device board is connected to the free BUS terminal of board E6-2L. The terminals are **BUS1, BUS2** and **BUS3**. The direction of installation is shown in illustration 9. The extra device board terminal must fit completely into the BUS terminal. Check that the green LED on the extra device board lights up. This shows that the program has recognised the board type and that the board is ready for operation.

If the LED does not light up and there are several extra device boards in the controller, you can search for the defective board as follows:

1. Switch power off of the controller.
2. Remove all extra device boards from terminals BUS1, BUS2 and BUS3.
3. Reinstall one board at a time.
4. Switch power back on.
5. If the LED lights up, the board in question is OK.
6. Repeat steps 1...5 for all extra device boards.
7. If the LED did not light up in any extra device board, the fault is in the basic controller.

The service terminal equipped with a display does not have a LED. Instead, a functioning board will show a numeric series or a text on the display. In a defective terminal, the display is out or its segments are lit sporadically.

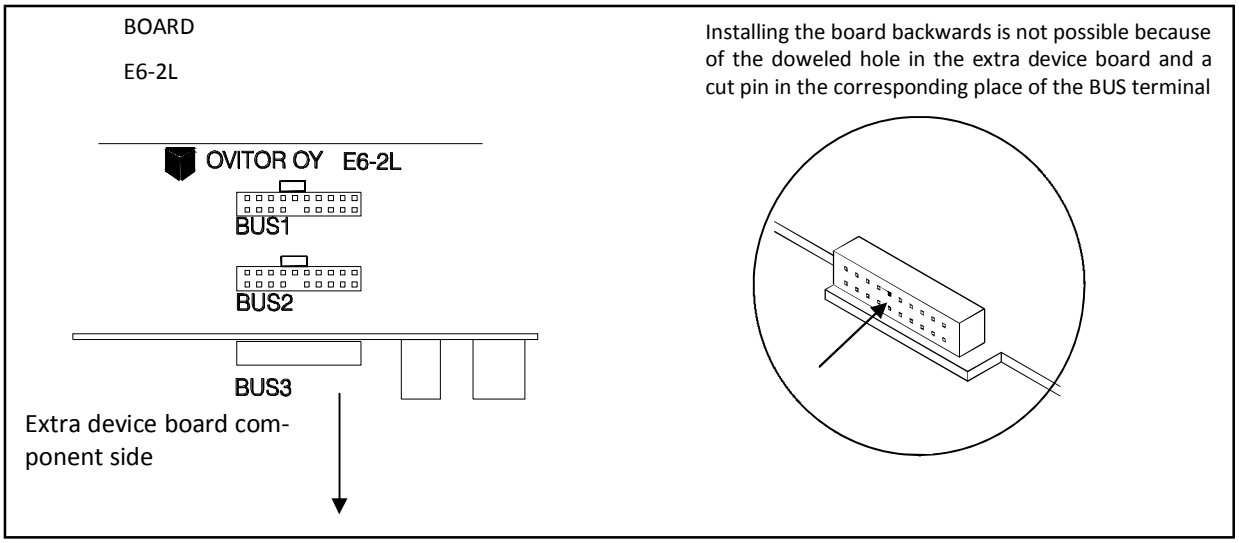

BOARD
E6-2L
OVITOR OY E6-2L
BUS1
BUS2
BUS3
Extra device board component side
Installing the board backwards is not possible because of the doweled hole in the extra device board and a cut pin in the corresponding place of the BUS terminal

Fig. 9.

8. WARNING AND TRAFFIC LIGHTS

8.1. WARNING LIGHT CONTROL

The control unit E6L can be equipped with two different types of extra device boards for warning light control: E6-5-01 and E6-5-05. When using the warning light board E6-5-01, the door starts moving immediately at an open or close command. When using the warning light board E6-5-05, the lights will warn before the starting of the door, and the door only starts moving after the warning time set in the controller.

A separate peripheral device board **CON3** or **CON4** (accessories) can also be actuated through the flat cable of the warning light extra device boards. The board CON3 is equipped, in addition to the normal warning light control, with potential-free contact control for, e.g., an air curtain blower or lighting control and potential-free contact data for the open and closed positions of the door.

8.2. WARNING LIGHT CONTROL

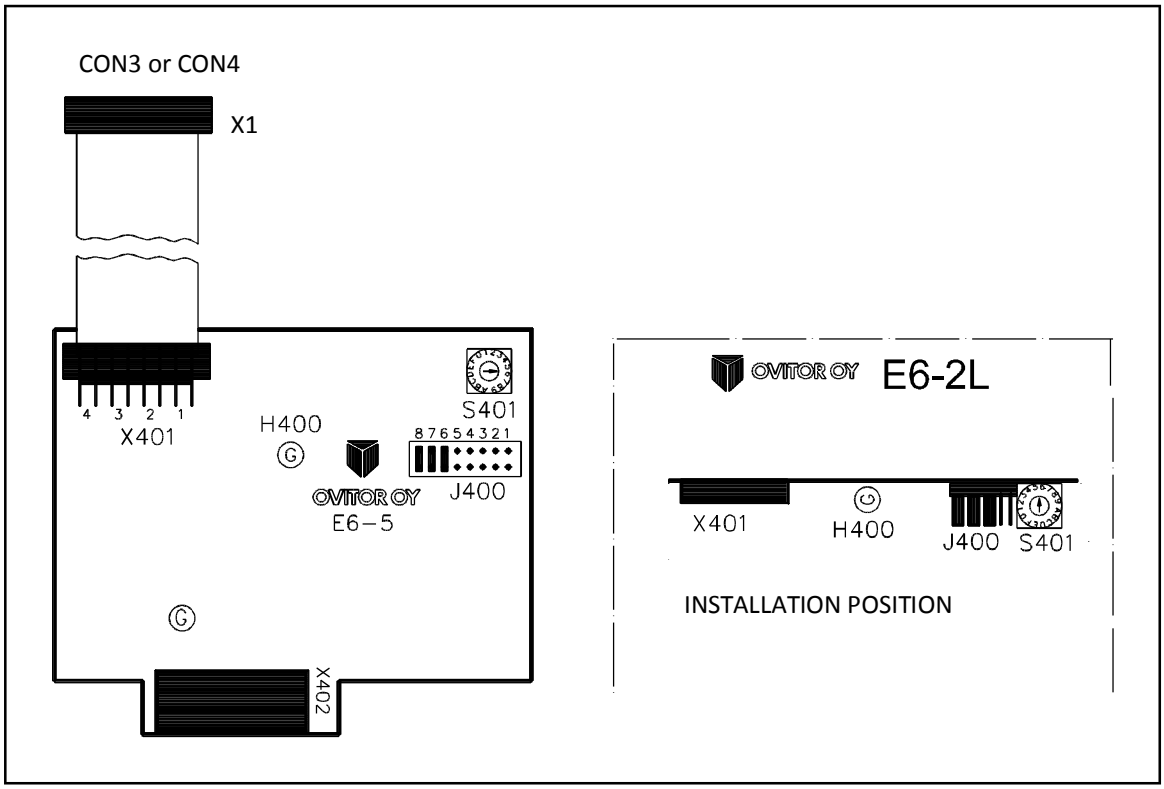


Fig. 10. Warning light control board E6-5-01

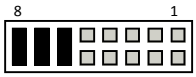
The warning light control board E6-5-01 is installed according to the above-mentioned instructions. The warning lights are programmed with rotary switch **S401** and pin terminal **J400**. Places 1, 2, 3, 4, 5 and 6 of the pin terminal must be left in their factory settings, i.e. 1, 2, 3, 4 and 5 in the 'OFF' position and 6 in the 'ON' position. The 'OFF' position means that there is no short circuit plug at that place of the pin terminal and the 'ON' position that a short circuit plug has been installed in the pin terminal.

If the controller is equipped with service terminal E6-6-02/3E, the display shows, when place 7 of the pin terminal is changed, for a moment the text '*L130*' and after that '*OFF*' or '*ON*' according to the position of the switch. When place 8 of the pin terminal is changed, the display shows for a moment the text '*L120*' and after that '*OFF*' or '*ON*' according to the position of the switch.

8. WARNING AND TRAFFIC LIGHTS

NORMAL FIXED RED/GREEN FUNCTION

J400 place 8 in ON

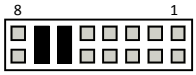


J400 place 7 in ON

In the normal 'fixed red/green' function, relay **K3** is constantly on pull. When the door is closed and starts to open, the red light will be constantly on. When the door reaches its open position, relay **K4** starts pulling, and the light changes into green. The time set with rotary switch **S401** before the automatic closing of the door, relay K4 releases, and the red light lights up and remains on through the closing movement and when the door is in the closed position.

FLASHING RED/FIXED GREEN FUNCTION

J400 place 8 in OFF

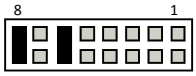


J400 place 7 in ON

In the 'flashing red' function, relay K3 is on release while the door is closed, and none of the lights is on. When the door starts opening, relay K3 begins to flash the red light, and when the door reaches the open position, relay K3 remains on pull, and simultaneously relay K4 pulls, preventing the red light from lighting up. The time set with rotary switch S401 before the automatic closing of the door, relay K4 releases, and relay K3 begins to flash and continues to do so through the closing movement. When the door reaches the closed position, relay K3 releases, preventing the red light from flashing. By adding a green light it can be made to remain constantly on while the door is in the open position.

FLASHING-FIXED RED/FIXED GREEN FUNCTION

J400 place 8 in ON

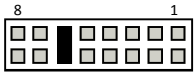


J400 place 7 in OFF

In the 'flashing-fixed red/fixed green' function, relay K3 is on pull while the door is closed, and the red warning light is constantly on. When the door starts opening, relay K3 begins to flash the red light, and when the door reaches the open position, relay K3 remains on pull, and simultaneously relay K4 pulls, lighting up the green light. The time set with rotary switch S401 before the automatic closing of the door, relay K4 releases, and relay K3 begins to flash the red warning light and continues to do so through the closing movement. When the door reaches the closed position, relay K3 remains on pull and keeps the red light constantly on.

CONTINUOUS WARNING OF MOVEMENT FUNCTION

J400 place 8 in OFF



J400 place 7 in OFF

In the 'continuous warning of movement' function, relays K3 and K4 are on release while the door is closed, and the light is off. When the door starts opening, relay K3 pulls and the warning light begins to flash. When the door reaches the open position, relay K4 pulls and the light goes out. The time set with rotary switch S401 before the automatic closing of the door, relay K4 releases, and the warning light begins to flash and continues to do so through the closing movement. When the door reaches the closed position, relay K3 releases and the light goes off. By adding a green light it can be made to remain constantly on controlled by K4 while the door is in the open position.

WARNING LIGHT ADVANCE

S401 POSITION	Warning light advance [s]	S401 POSITION	Warning light advance [s]
0	0	8	8
1	1	9	9
2	2	A	10
3	3	B	11
4	4	C	12
5	5	D	13
6	6	E	14
7	7	F	15

The warning light advance is set with rotary switch **S401** according to the table below. If the controller is equipped with service terminal E6-6-02/3E, the display shows, when the position of the rotary switch is changed, for a moment the text '*A110*' and after that the set time. The time of the warning light advance must be shorter than the time set for automatic closing (cf. page 7).

In warning light control with board E6-05-01, the warning light advance does not lengthen the stay open time of automatic closing. Driven by the close button, the door starts closing immediately, without first warning with a light. Equally, driven by the open button, the door starts opening immediately, without first warning with a light.

8.3. WARNING LIGHT CONTROL BOARD E6-5-05

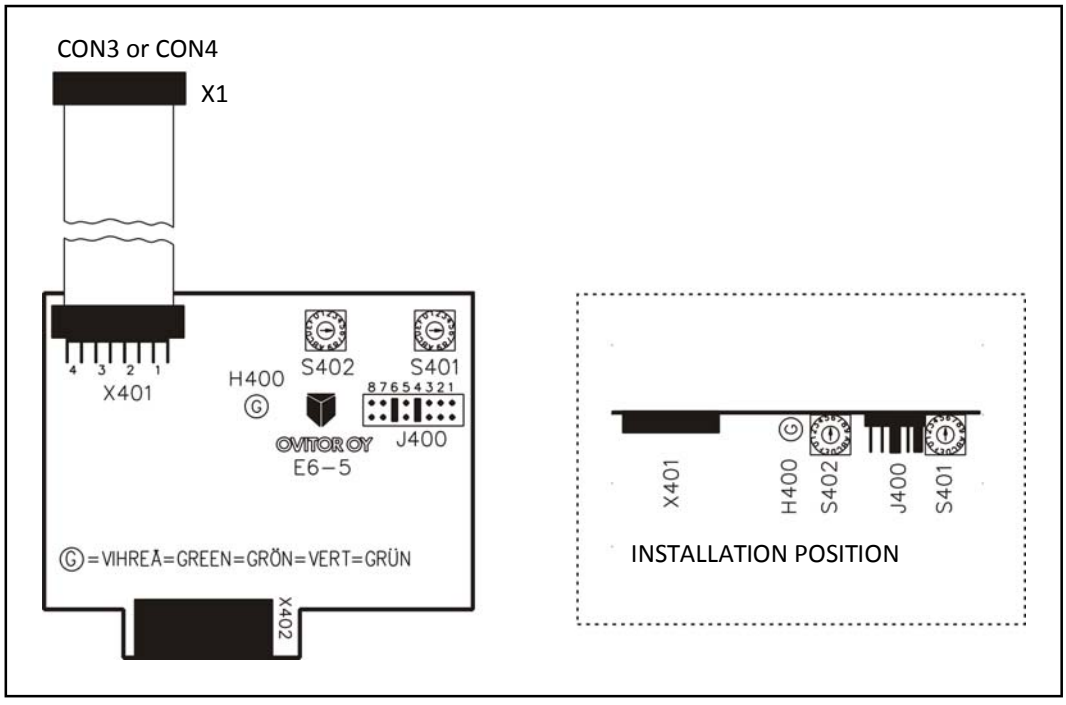


Fig. 11. Warning light control board E6-5-05

Warning light control board E6-5-05 (figure 11) is installed according to the above instructions. The warning lights are programmed with rotary switches **S401** and **S402** and pin terminal **J400**. Places 1, 2, 3, 4, 5 and 6 of the pin terminal must be left in their factory settings, i.e. 1, 2, 3 and 5 in the 'OFF' position and 4 and 6 in the 'ON' position. The 'OFF' position means that there is no short circuit plug at that place of the pin terminal and the 'ON' position that a short circuit plug has been installed in the pin terminal.

8. WARNING AND TRAFFIC LIGHTS

If the controller is equipped with service terminal E6-6-02/3E, the display shows, when place 7 of the pin terminal is changed, for a moment the text '*L130*' and after that '*OFF*' or '*ON*' according to the position of the switch. When place 8 of the pin terminal is changed, the display shows for a moment the text '*L120*' and after that '*OFF*' or '*ON*' according to the position of the switch.

NORMAL FIXED RED/GREEN FUNCTION

J400 place 8 in ON

J400 place 7 in ON

In the normal 'fixed red/green' function, relay **K3** is constantly on pull. When the door is closed and starts to open, the red light will be constantly on. When the door reaches its open position, relay **K4** starts pulling, and the light changes into green. When the stay open time of automatic closing runs out or the close button is pressed, relay K4 releases, and the red light turns on and remains on, first, during the time of 'warning light delay in the closing direction' set with rotary switch S401 -the door does not close until after this - and then during the time of closing and while the door is in the closed position.

FLASHING RED/FIXED GREEN FUNCTION

J400 place 8 in OFF

J400 place 7 in ON

In the 'flashing red' function, relay K3 is on release while the door is closed. When the door is driven open, relay K3 flashes the red light, first, during the time of 'warning light delay in the opening direction' set with rotary switch S402 -after which the door starts to open - and then during the opening movement. When the door reaches the open position, relay K3 remains on pull, and at the same time relay K4 pulls, preventing the red light from lighting up. When the stay open time of automatic closing runs out or the close button is pressed, relay K4 releases, and relay K3 begins to flash the red light, and flashes, first, during the time of 'warning light delay in the closing direction' set with rotary switch S401 -after which the door closes - and then during the time of closing. After the door reaches the closed position, relay K3 releases, preventing the red light from flashing. By adding a green light it can be made to remain constantly on while the door is in the open position.

FLASHING-FIXED RED/FIXED GREEN FUNCTION

J400 place 8 in ON

J400 place 7 in OFF

In the 'flashing-fixed red/fixed green' function, relay K3 is on pull while the door is closed, and the red warning light is constantly on. When the door is driven open, relay K3 flashes the red light, first the time of 'warning light delay in the opening direction' set with rotary switch S402 - after which the door starts to open - and then during the opening movement. When the door reaches the open position, relay K3 remains on pull, and simultaneously relay K4 pulls, lighting up the green light. When the stay open time of automatic closing runs out or the close button is pressed, relay K4 releases, and relay K3 begins to flash the red light, flashing, first, for the time of 'warning light delay in the closing direction' set with rotary switch S401 - after which the door closes - and then during the time of closing. After the door reaches the closed position, relay K3 remains on pull, keeping the red warning light constantly on.

CONTINUOUS WARNING OF MOVEMENT FUNCTION

J400 place 8 in OFF

J400 place 7 in OFF

In the 'continuous warning of movement' function, relays **K3** and **K4** are on release while the door is closed, and the light is off. When the door starts opening, relay K3 pulls and the warning light begins to flash. When the door reaches the open position, relay K4 pulls and the light goes out. The time set with rotary switch **S401** before the automatic closing of the door, relay K4 releases, and the warning light begins to flash and continues to do so through the closing movement. When the door reaches the closed position, relay K3 releases and the light goes off. By adding a green light it can be made to remain constantly on controlled by K4 while the door is in the open position.

WARNING LIGHT DELAY IN CLOSING DRIVE

The warning light delay in the closing direction is set with rotary switch S401. If the controller is equipped with service terminal E6-6-02/3E, the display shows, when the position of the rotary switch is changed, for a moment the text '*A112*' and after that the set time.

In E6-5-05 warning light control, the warning light delay prolongs the stay open time of the door. Also driving by the close button makes the door start closing only after having warned with the light.

S401 POSITION	Warning light advance in the closing direction [s]	S401 POSITION	Warning light advance in the closing direction [s]
0	0	8	8
1	1	9	9
2	2	A	10
3	3	B	11
4	4	C	12
5	5	D	13
6	6	E	14
7	7	F	15

WARNING LIGHT DELAY IN OPENING DRIVE

The warning light delay in the opening direction is set with rotary switch **S402**. If the controller is equipped with service terminal E6-6-02/3E, the display shows, when the position of the rotary switch is changed, for a moment the text '*A114*' and after that the set time.

In E6-5-05 warning light control, driving by the open button makes the door start opening only after having warned with the lights during the time of 'warning light delay in the opening direction'. If, however, the opening drive is given in the middle of closing movement, there is no warning light delay, but the direction of movement of the door is changed immediately. Also a safety edge pulse and the safety photocell will immediately open a closing door.

S401 POSITION	Warning light advance in the opening direction [s]	S401 POSITION	Warning light advance in the opening direction [s]
0	0	8	8
1	1	9	9
2	2	A	10
3	3	B	11
4	4	C	12
5	5	D	13
6	6	E	14
7	7	F	15

8.4. E6-VLV CONTROL CARD FOR ONCOMING TRAFFIC LIGHT

The E6-VLV oncoming traffic light control card is used to control traffic on ramps and in other such places where traffic can proceed in one direction at a time. Areas of application are car parks and other, similar places with an entrance ramp that is the width of a single vehicle and that must be reserved based on the direction of traffic. The ramp has a door or equivalent, or, alternatively, both a door and a barrier. In such cases, the door is used at night and the barrier during the daytime.

There are red/green traffic lights at both ends of the ramp, which are given control signals by the card upon receipt of a reservation request. The lights are controlled either with coils or the equivalent or by control devices at the ends of the ramp with a potential-free contact. It is essential that the control devices be direction-sensing. Direction-sensing is implemented via software. In order for the direction-sensing to work correctly, the vehicle must encounter the two sensing control devices in the correct order and be in their area of detection at the same time (for example, two vehicle detector coils at a distance of around one metre from each other). Incoming direction sensing is connected to connectors 15, 16, and 17, with 17 being common. Connectors 15 and 17 are connected first, and then 16 and 17. The green diodes light up in the following order: first **H1** and then **H2**. Outgoing direction sensing is connected to connectors 20, 21, and 22, with 22 common. Connectors 22 and 21 are connected first, and then 22 and 20. The green diodes light up in the following order: first **H5** and then **H4**. If reservation requests are implemented with, for example, buttons or the equivalent, with a potential-free contact, incoming traffic reservation is connected to connectors 18 and 19, and when the contact closes, green diode **H3** is illuminated. Correspondingly, outgoing traffic reservation is connected to connectors 29 and 30, and when the contact closes, green diode **H8** lights up.

If the controller includes the E6-6-02/3E service terminal and the controller receives a reservation request from the incoming traffic control device, the display reads 'OU b' for a moment, or 'OU t' when the reservation request comes from a direction-sensing control. The corresponding texts for outgoing traffic are '*IN B*' and '*IN T*'.

The operation of the E6-VLV card is controlled via a flat cable directly from the bus connector of the E6-2L card. The programming required for light control with the E6-VLV card can be done using the jumpers of the **X12** connectors. The LEDs indicate operation. Perform duration settings with rotary switches **S1** and **S2**, relays, and required terminal blocks for the lights and controls.

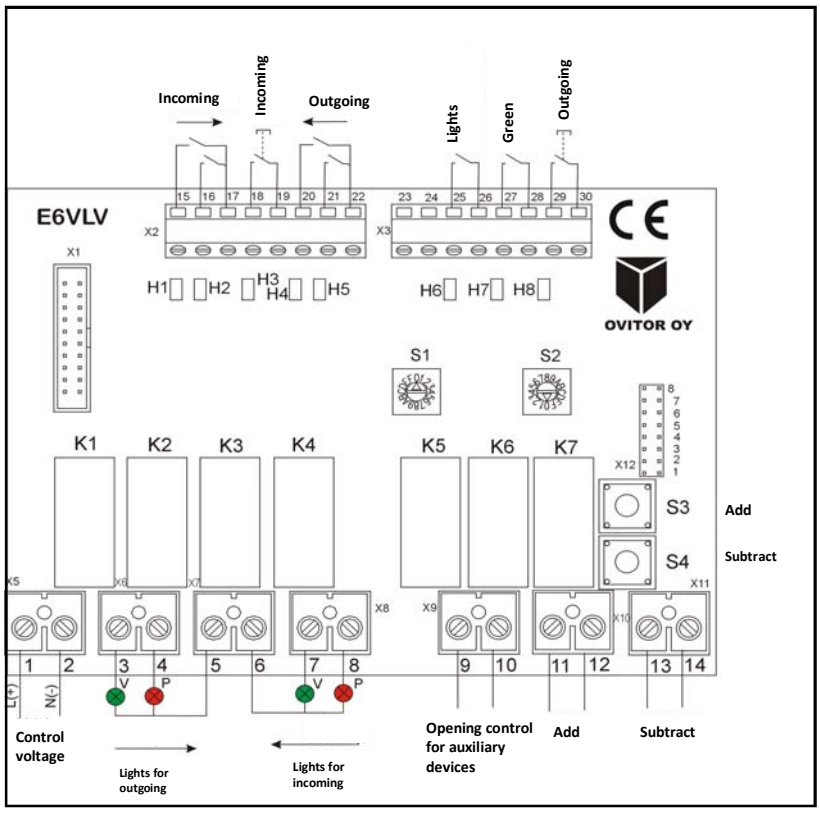


Fig. 12. E6-VLV board.

OPERATION

Select the light control method with jumpers 1 and 2 of connector **X12**. If the controller includes the E6-6-02/3E service terminal, the text '*A402*' and the selected control method are shown briefly on the display.

Jumper 1	Jumper 2	Control method
OFF	OFF	1
OFF	ON	2
ON	OFF	3
ON	ON	4

Control method 1:

A red light is on at both ends of the ramp. A reservation request causes the green light to be illuminated for the driving direction and turns off the red light if there are no outstanding reservations from the opposite direction. Also, the door is sent an automatic open command. The light changes back to red after the time set with jumpers 5 and 6 of connector **X12**. A new reservation request extends the illumination of the green light and sends a new open command to the door. If there is a constant queue and there are no reservation requests from the opposite direction, the green light stays on constantly, on the assumption that each vehicle generates a reservation request.

If there is a constant queue and a reservation request is received from the opposite direction, the green light is turned off and the red light turned on after the set direction change interval so that vehicles can drive through from the other direction. The light at the other end changes to green after the drive-through time. The drive-through time is set to be no less than the time it takes for the slowest traffic to pass through plus the green light's on time as set with jumpers 5 and 6 of connector X12. Weather conditions may affect the drive-through time, so the drive-through time must always be set to be sufficiently long to prevent accidents.

Control method 2:

A green light is on at one end of the ramp and a red light at the other. Light selection for the ends of the ramp can be made with a potential-free contact connected to terminals 27 and 28. If the contact is closed (green LED **H7** on), the green light is on at the outside end and red at the inside end. If the contact is open, the inside end has a green light and the outside end a red one. Access control can be used to control rush-hour traffic; e.g., the green light is constantly lit for incoming traffic at the outside end of the ramp in the morning, and for outgoing traffic at the inside end in the evening. This way, vehicles do not have to needlessly wait for the green light during rush hours. Otherwise, operation is as in control method 1. If there are no open commands to the door in this control method, you must remember that the door closes automatically after the set time. If the control is only a traffic control, must the automatic closing of the door stop, e.g. by giving a continuous open command to the door.

Control method 3:

The lights at both ends of the ramp are turned off. When a reservation request is received, the red light is lit at the opposite end and the green light lit for the reserve. Otherwise, operation is as in control method 1 with the exception that if there are no more reservation requests, the lights are turned off at both ends of the ramp.

The lights can be kept dark with a potential-free contact connected to terminals 25 and 26. If the contact is open, the lights are lit as in option 1, and when the contact is closed (green LED **H6** lit), the lights are turned off as described above. Access control can be used to turn off the lights – for example, for night-time.

Control method 4: Reservation only.

8. WARNING AND TRAFFIC LIGHTS

Jumper 5	Jumper 6	Green light's duration
OFF	OFF	10 s
OFF	ON	15 s
ON	OFF	25 s
ON	ON	40 s

If the controller includes the E6-6-02/3E service terminal, the text '*A406*' and the selected time are briefly displayed when the time is changed.

BLINKING OF THE GREEN LIGHT BEFORE THE SWITCH TO RED

Select blinking green before the switch to red by placing a jumper in pin 4 of connector **X12**. The light blinks for a total of 3 seconds, with a cycle length of 0.5 seconds. If the controller includes the E6-6-02/3E service terminal, the text '*A400*' and function status ('*ON*' or '*OFF*') are shown for a moment on the display.

GREEN ONLY AFTER THE DOOR IS OPENED

You can opt for the green light to be turned on only after the door is opened, by placing a jumper in pin 3 of connector X12. When the jumper is in place, the light turns green and time is counted from the door reaching the open limit. If the controller includes the E6-6-02/3E service terminal, the text '*A401*' and the function status ('*ON*' or '*OFF*') are briefly displayed when the control method is changed. This change is not possible in control method 2. In that case there mustn't be a jumper in place 3.

SEPARATE OPENING CONTROL

The card supports separate opening control from terminals 9 and 10 (for example, for a barrier in daytime use). You can determine the functioning of the opening control by placing a jumper in pin 7 of the X12 connector. When the jumper is in place, opening control is constant when the green light is lit, and when the jumper is not in place, the controller sends a one-second opening pulse when it receives a reservation request. Pulse operation is intended mainly for opening controls with quittance. If the controller includes the E6-6-02/3E service terminal, the text '*A405*' and the function status ('*ON*' or '*OFF*') are displayed for a moment when the control method is changed.

CONTROL UP/DOWN FOR COUNTER

With additional relays, up/down information from the card can be sent to a counter. You can get separate, one-second potential-free contact information for incoming and outgoing traffic events from terminals 11 and 12 (add), and 13 and 14 (subtract). For correction functionality, the card has buttons **S3** (add) and **S4** (subtract).

DRIVE-THROUGH TIME

Set the drive-through time with rotary switch **S2**. If the controller includes the E6-6-02/3E service terminal, the text '*A403*' and the selected time are briefly displayed when the time is changed.

S2 position	Time [s]	S2 position	Time [s]
0	15	8	100
1	20	9	120
2	25	A	150
3	30	B	180
4	35	C	220
5	45	D	260
6	60	E	320
7	80	F	400

DIRECTION CHANGE TIME

Set the direction change time with rotary switch **S1**. If the controller includes the E6-6-02/3E service terminal, the text '*A404*' and the selected time are briefly displayed

S1 Position	Time [s]	S1 Position	Time [s]
0	15	8	100
1	20	9	120
2	25	A	150
3	30	B	180
4	35	C	220
5	45	D	260
6	60	E	320
7	80	F	400

9. ACCESSORY CARDS

9.1. VPLV BOARD E6-5-06

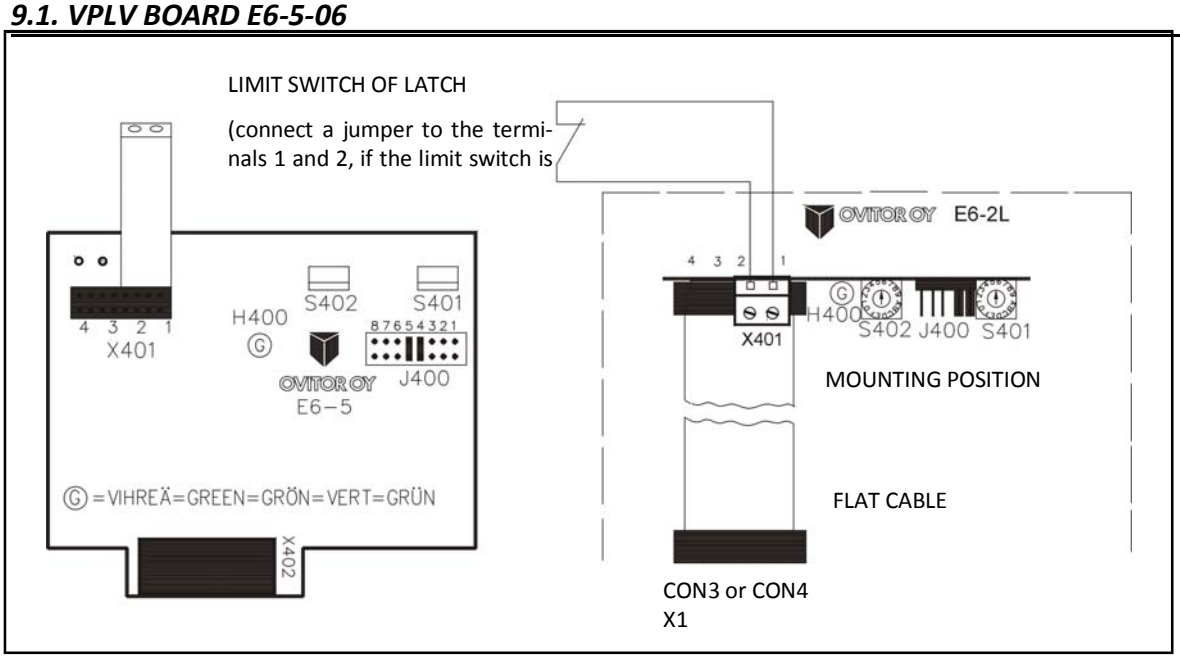


Figure 13. VPLV board E6-5-06

With the VPLV-board E6-5-06, E6L can control an air curtain blower, a door locking latch, illumination or another that kind of function needed when the door is open or starting to open. When using the VPLV-board E6-5-06 the relays **K3** and **K4** situated on the power board E6-1L of the basic controller are always on pull, when the door is open, or when it is starting to open. When these relays are being used e.g. for controlling a locking latch, the after-movement of the motor has to be considered. This means that when the closing contactor of the motor has released, the locking of the latch cannot be performed. Likewise, when opening a closed door, the latch needs time to open before the door starts to open. For these locking functions the waiting times can be set on the board E6-5-06 according to the adjacent table. The internal connection of the contact tips of the relays K3 and K4 on the board E6-1L is described in the drawing no. 443 at the end part of this manual.

A separate peripheral device board **CON3** or **CON4** (accessories) can be controlled with the VPLV-board. The relays K3 and K4 on the CON3- and CON4-boards are functioning in the same way as described above. Furthermore it is possible to receive potential free information on the location position of the door and one extra potential free tip contact, which functions identically with the functions of the relays K3 and K4. See drawing no. 385L at the end of this manual.

The VPLV-board is to be installed according to the instructions given earlier in this manual. The flat cable of the VPLV-board is to be connected to the terminal **X204** on the power board E6-1L of the basic controller. The places 1, 2, 3, 4, 5 and 6 of the pin terminal **J400** must be left in their factory settings with 1, 2, 3 and 6 in 'OFF' position and 4 and 5 in 'ON' position. The 'OFF' position means that there is no short circuit plug and the 'ON' position that a short circuit has been installed. The waiting time after door stop is set with the rotary switch **S401** and the waiting time for the locking latch to open with the rotary switch **S402**.

Service terminal E6-6-02/3E will display, when changing the:

- waiting time after door stop: *text 'R116' and after that the set waiting time after door stop.*
- waiting time for the locking latch to open: *text 'R118' and after that the set waiting time for the latch to open.*

Position switch can be used to indicate if the lock of the latch is open. The position switch will be connected to the screw terminals 1 and 2 on the board E6-5-06. If a position switch is not installed, or not in use, the terminals 1 and 2 must be linked with short-circuit plug to enable operation of the drive unit. When the lock latch is open, the contact tip of the position switch closes and the door is free to move.

When the door gets an opening impulse from closed position, the relays **K3** and **K4** will be pulling during the waiting time set for the latch to open, before the door starts to move. If a position switch for the latch is being used, the contact tips of this switch will have to connect the terminals 1 and 2 together within the waiting time, during which the latch reaches its full open position. If the space between 1 and 2 remains open after the waiting time is over, the door will not open. The red error LED **H103** on the board E6-2L will start flashing. If the service terminal E6-6-02/3E is used, the display will show error code '*E22*'.

S401 POSITION	Waiting time before locking [s]	S401 POSITION	Waiting time before locking [s]
0	0	8	5
1	0,5	9	10
2	1,0	A	15
3	1,5	B	20
4	2,0	C	25
5	2,5	D	30
6	3,0	E	45
7	4,0	F	60

S402 POSITION	Waiting time for the lock to open [s]	S402 POSITION	Waiting time for the lock to open [s]
0	0	8	5
1	0,25	9	10
2	0,5	A	15
3	1,0	B	20
4	1,5	C	25
5	2,0	D	30
6	3,0	E	45
7	4,0	F	60

9. ACCESSORY CARDS

9.2. SUTI BOARD E6-5-07

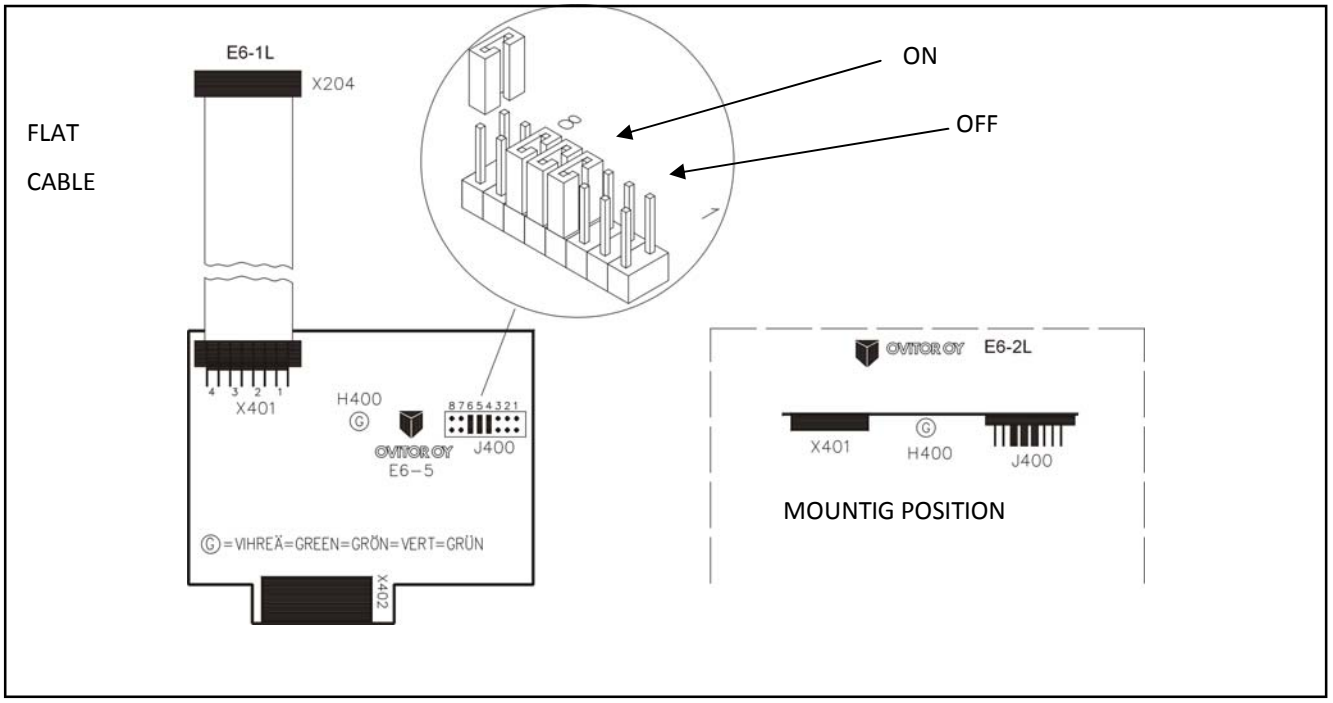


Fig. 14. SUTI board E6-5-07

SUTI-board E6-5-07 enables information on the direction of movement of the door and on passage through the door. The SUTI-board is to be installed according to the instructions given earlier in this manual. The flat cable of the board is to be connected to the terminal **X204** on the power board E6-1L. Relays K3 and K4 on the power board are being controlled through the flat cable. The internal connection of the contact tips of the relays K3 and K4 on the board E6-1L is described in the drawing no. 443 at the end part of this manual. The places 1, 2, 3, 4, 5 and 6 of the pin terminal **J400** must be left in their factory settings with 1, 2 and 3 in 'OFF' position and 4, 5 and 6 in 'ON' position. The 'OFF' position means that there is no short circuit plug and the 'ON' position that a short circuit has been installed.

SUTI-board also enables control of a separate peripheral device board CON3 or CON4 (accessories). The relays K3 and K4 on the CON3- and CON4-board are functioning as described hereafter. Relays K5, K6 and K7 on the CON3-board widens the range of options. Potential free information on location positions are received through relays K6 and K7. An air curtain blower or similar can be controlled through the relay K5. See the drawing no. 385L at the end of this manual.

INFORMATION ON DIRECTION OF MOVEMENT AND ON DOOR BEING CLOSED

The reception of this information is set with the short-circuit plug J400.7-8

J400 place 8 in OFF

J400 place 7 in OFF

When the door gets an impulse for opening, the relay K3 will be pulling and during closing the relays K3 and K4 will be pulling.

J400 place 8 in ON

J400 place 7 in OFF

When the door is closed the relays K3 and K4 will be pulling.

J400 place 8 in ON

J400 place 7 in ON

When the door is closed the relay K3 is on pull. When the door is closed and locked the relays K3 and K4 are on pull. To enable this alternative, VPLV-board must be installed to control board CON3 or CON4. The position switch for the latch must also be connected.

If a device, such as e.g. the safety micro switch of the disengagement lever, is connected to the terminals 34, 35 or 36, 37 of the terminal board E6-2L and if this device interrupts the circuit, then the information on the door being closed will disappear. This information comes back, when the interrupted circuit closes again and when the door is at the limit switch for closed position and the micro switch for the closed limit receives control current. If the door was stopped in the closed position through an impulse from the safety edge and the safety micro switch of the disengagement lever interrupted the circuit, then the closed door information will disappear. The closed door information will not disappear through an impulse from a photo cell, from the safety edge or from a STOP-button if they are connected to their correct terminals in the safety circuit, like shown in the control circuit diagram no. 336L.

Changing the functioning position of J400.8, the display of the service terminal **E6-6-02/3E**(option) will first show for a moment the text '*L135*' and after that '*OFF*' or '*ON*' depending on the position of the switch. When changing the position of J400.7 the display will first show for a moment the text '*L136*' and after that '*OFF*' or '*ON*' depending on the position of the switch.

9.3. BOARD E6-5-03 FOR AUTOMATIC CLOSING WITH QUITTANCE

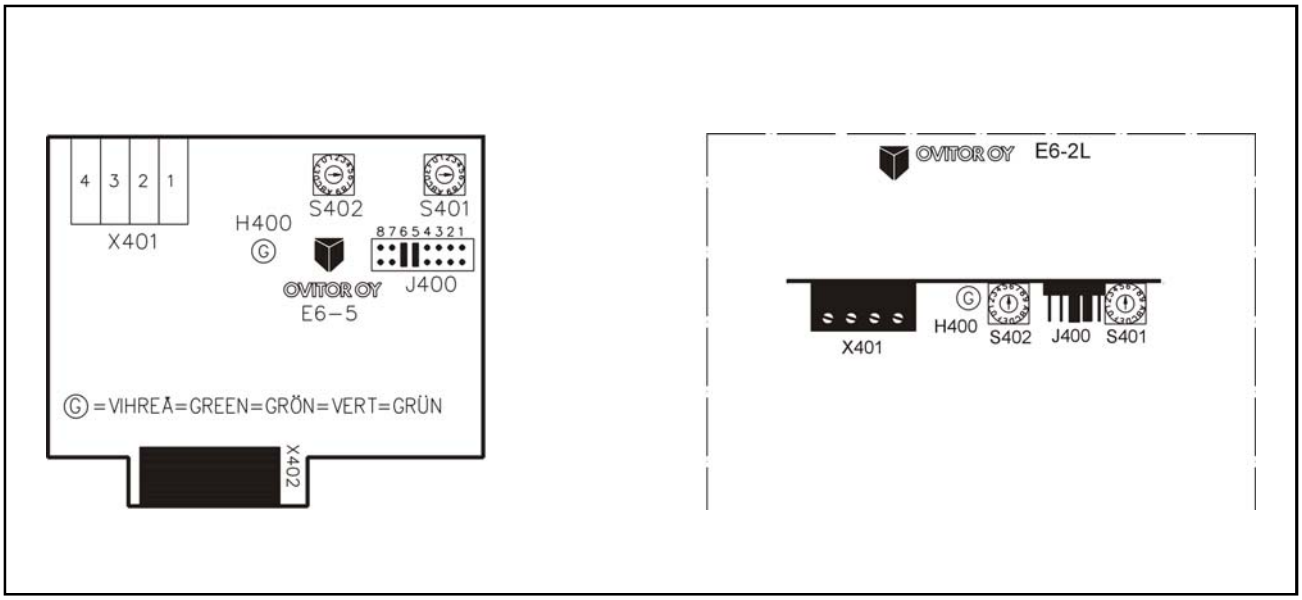


Fig. 15. Board E6-5-03

9. ACCESSORY CARDS

Automatic closing with quittance means that the door closes automatically after the set time only after there has been movement through the doorway and that the safety photocell beam has been broken. The automatic closing after quittance will not be produced unless the terminals 12 and 13 on the terminal board E6-2L are connected to each other with a short-circuit link, or through a regulating device like e.g. a selector switch, or the rotary switch **S133** is in position 0 and jumper No. 8 of terminal **J4** is disconnected.

Delayed quittance means that the safety photocell beam must remain broken a set time. This is usually used to indicate the passage of vehicles. With delayed quittance, a short pulse from the photocell, e.g., at the passage of a pedestrian through the door, does not produce a quittance.

Self-quittance means that the door awaiting quittance nevertheless closes after a longer set time, even if there is no passage through the doorway. This prevents the door from remaining permanently in the open position. Opening drive with quittance is connected on board E6-5-03. With normal opening drive, the door closes after the set time independently of whether there has been passage through the doorway or not. The desired operation and times are set on board E6-5-03. Opening drive with quittance for the half-open position is connected on board E6-5-03, to terminals 1 and 2, and for full-open position to terminals 3 and 4. Note the order of the terminals on the board. Opening drive with quittance may also be connected direct from terminal board E6-2L by wiring a terminal on board E6-2L for the half-open position to terminal 1 on board E6-5-03, and for full-open position to terminal 3, e.g. in impulse control from terminal 29 to terminal 3 on board E6-5-03; see drawing 337L. In this case the terminals 2 and 4 will be unconnected.

Board E6-5-03 for automatic closing with quittance is installed according to the above instructions. The time delays and the selection of the mode of operation are set with rotary switches **S401** and **S402**.

- If zero seconds is selected as delay before quittance with rotary switch S402, delayed quittance is not in use.
- If position 0 is selected for self-quittance with rotary switch S401, self-quittance does not take place.

Places 3, 4, 5 and 6 of the pin terminal must be left in their factory settings, 3 and 4 in the ‘OFF‘ position and 5 and 6 in the ‘ON‘ position. The ‘OFF‘ position means that there is no short circuit plug and the ‘ON‘ position that a short circuit has been installed.

The delayed quittance is set with rotary switch S402 according to the following table. When the controller is equipped with service terminal E6-6-02/3E and the rotary switch is rotated to the position ’0’, the display shows for a moment the text ‘*L90*‘ and after that ‘*OFF*‘. In other positions the display shows for a moment the text ‘*A90*‘ and after that the set time for delayed quittance in seconds.

S402 POSITION	Delayed quittance [s]	S402 POSITION	Delayed quittance [s]
0	0 (OFF)	8	3,0
1	0,2	9	4,0
2	0,4	A	5,0
3	0,6	B	6,0
4	0,8	C	7,0
5	1,0	D	8,0
6	1,5	E	9,0
7	2,0	F	10,0

The delay before self-quittance is set with rotary switch **S401** according to the table below. If the controller is equipped with service terminal E6-6-02/3E, the display shows, when the rotary switch is rotated to position '0', for a moment the text '*L100*' and after that '*OFF*'. In other positions the display shows for a moment the text '*A100*' and after that the set delay before self-quittance in seconds. When the S401 is in the 0 position, the door does not close without quittance from the photocell.

S401 POSITION	Self-quittance delay [s]	S401 POSITION	Self-quittance delay [s]
0	0 (OFF)	8	120
1	10	9	150
2	20	A	170
3	30	B	200
4	50	C	300
5	60	D	400
6	80	E	600
7	100	F	1200

NUMBER OF PULSES BEFORE QUITTANCE

In addition to the foregoing functions it is possible, with the board E6-5-03, to set the number of pulses required, i.e. how many times the safety photo cell beam must be broken, before the pulses will be accepted as quittance.

J400 Place 1	J400 Place 2	Number of beam brakes required
OFF	OFF	1
OFF	ON	2
ON	OFF	3
ON	ON	4

With delayed quittance function every pulse must have at least the length of time set for the beam to be broken. Delayed quittance and self-quittance are functioning quite normally. The pulse counter will return to the starting point after every quittance for opening.

9.4. PROGRAM BOARD E6-5-04

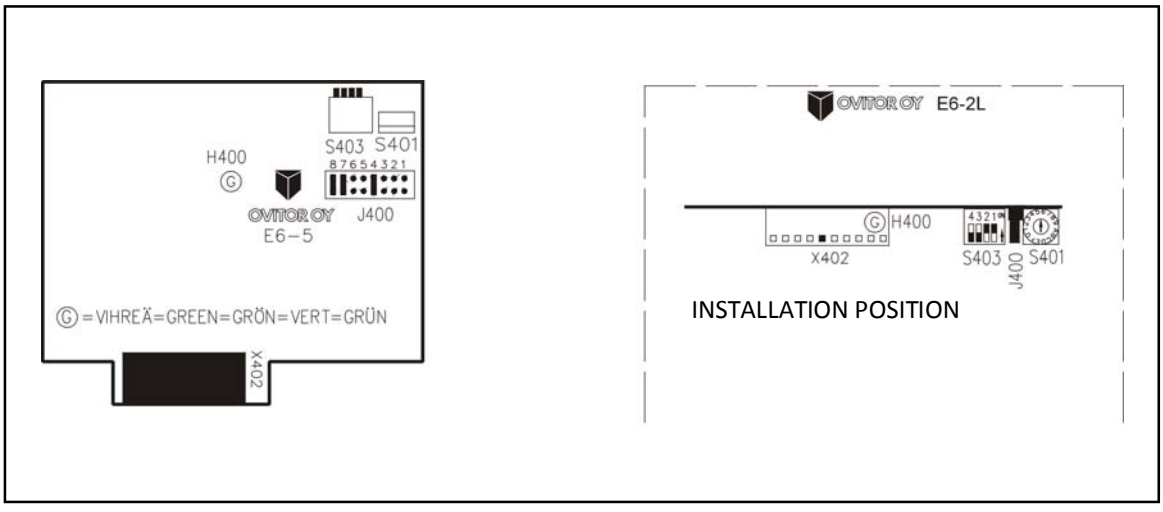


Fig. 16. Program board E6-5-04

9. ACCESSORY CARDS

The functions of the controller in various exceptional cases has been explained above in this manual. These functions can be modified as requested, by adding program board E6-5-04 to the controller. The program board is installed according to the above instructions on to a free bus terminal.

The parameters are programmed from switches **S403.1**, S403.2, S403.3 and S403.4. Check the 'ON' and 'OFF' positions of switch 403 from the text printed on the switch. Places 1, 2, 3, 4, 5 and 6 of the pin terminal must be left in their factory settings, 1, 2, 3, 5 and 6 in the 'OFF' position and 4 in the 'ON' position. The 'OFF' position means that there is no short circuit plug and the 'ON' position that a short circuit has been installed.

When using the program board, it must be left in the control in order to maintain the desired functions. If the program board is removed, the desired programming is only stored until the next power failure. After the power failure, the control does not remember the parameters of the removed program board, but it will function according to the normal parameters.

CLOSING ON HOLD-TO-RUN

Closing on hold-to-run is set with switch **4** of the **S403**.

- ON: the controller closes the door on hold-to-run only (the close button must be pressed through the entire closing movement). No automatic closing.
- OFF: the door closes normally.

If the controller is equipped with a service terminal, the display shows, when the mode of the switch is changed, for a moment the text 'L210' and after that 'OFF' or 'ON' according to the position of the switch.

OPENING ON HOLD-TO-RUN

Opening on hold-to-run is set with switch **3** of **S403**.

- ON: the controller opens the door on hold-to-run only (the open button must be pressed through the entire opening movement).
- In position 'OFF' of the switch, the door opens normally.

If the controller is equipped with service terminal E6-6-02/3E, the display shows, when the mode of the switch is changed, for a moment the text '*L200*' and after that '*OFF*' or '*ON*' according to the position of the switch.

SUPPRESSION OF AUTOMATIC CLOSING WITH THE STOP BUTTON

In a normal case when automatic closing has been set in the control and the STOP button is pressed while the door is in its open position, the door will function as presented on page 9 of this manual. The said function can be changed into such that pressing any stop button makes the door always stay open, even if automatic closing were set.

This function is set with switch **2** of **S403**.

- ON: the door always remains in its open position at an impulse from any of the existing stop buttons. In this case the situation is cleared by pressing the close button or open-button, or by giving an opening impulse to the board for automatic closing with quittance, or by giving a closing impulse through single button control, if this has been programmed to close from open position. A single button control, which has been programmed for only opening function, will not clear the situation. After clearance, the door will close and be back in normal function, so that next time the door will close automatically from its open position.
- OFF: the door function is normal.

If the controller is equipped with service terminal E6-6-02/3E, the display shows, when the mode of the switch is changed, for a moment the text '*L190*' and after that '*OFF*' or '*ON*' according to the position of the switch.

TESTING THE DISAPPEARANCE OF AN OBSTACLE BY MEANS OF THE SAFETY EDGE

In a normal case when a pulse comes from the safety edge while the door is closing between the open limit and safety device limit, the door functions as presented on page 12 of this manual.

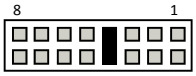
Functioning can also be selected so that the door remains open after the safety edge pulse, even if automatic closing were set. In this case, the situation is cleared by pressing the close button, whereupon the door closes and functions normally again. The staying open after the safety edge pulse, described above, is set with switch 1 of S403.

- In position 'ON' of switch 1, functioning is normal
- In position 'OFF' of switch 1 the control does not test the disappearance of the obstacle, whereupon the door remains open after the safety edge pulse.

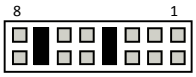
If the controller is equipped with service terminal E6-6-02/3E, the display shows, when the mode of the switch is changed, for a moment the text '*L180*' and after that '*OFF*' or '*ON*' according to the position of the switch.

CHANGING OF SAFETY EDGE FUNCTION INTO FUNCTION OF OTHER TYPE OF SAFETY DEVICE

The mode of function of a safety device, which is connected to the terminals 46 and 47 on the terminal board E6-2L, can be changed by means of leaving out, or by means of installing a short-circuit plug in the place 7 of the pin terminal J400 on the board E6-5-04.

J400 place 7 in OFF 

In this position any safety device, which has been connected to the terminals 46 and 47 will function like described in this manual under '*FUNCTIONING OF THE SAFETY EDGE'.*

J400 place 7 in ON 

To the terminals 46 and 47 is connected any safety device. This device will stop and open a closing door, or similar, after a delay before reversal, but between the limit switches for safety device and for closed position it will only stop the closing door.

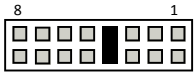
- If on the board E6-5-04 the switch 1 of **S403** is in position ON, the automatic closing will function normally.
- If the use of "testing of the safety edge"-function is not possible, it must take off separately. This happens by setting the DIP-switch 3 of **S131** to position OFF.
- If the switch 1 of S403 is in position OFF, the opening through impulse from the safety device will produce the malfunction message '*E23*', but the door will close automatically.

If the service terminal E6-6-02/3E has been connected to the controller and the place of the pin terminal 7 is changed, the display will first show for a short moment the text '*L230*' and after that '*OFF*' or '*ON*' according to the position of the switch.

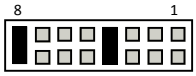
9. ACCESSORY CARDS

AUTOMATIC CLOSING FROM ALL OPEN POSITIONS

Automatic closing from all open positions is set by installing a short-circuit plug in the place 8 of the pin terminal **J400** of the board E6-5-04. The automatic closing will not take place unless the terminals 12 and 13 on the terminal board are connected to each other with a short-circuit link, or through a regulating device like e.g. a selector switch.

J400 place 8 in OFF 

The door closes automatically only from open, or reduced open position.

J400 place 8 in ON 

The door will always close automatically, if the door is not ready in closed position. If the service terminal E6-6-02/3E has been connected to the controller, so when changing the place of the pin terminal 8, the display will first show for a moment the text '*L220*' and after that '*OFF*' or '*ON*' according to the position of the switch.

RELIEVING THE SAFETY EDGE

If you are using an electronic safety edge and you want to apply to it the testing function specified in the initial section of the manual, the safety edge must be driven sufficiently tightly against the floor in order to obtain an impulse. The electronic safety edge must not, however, be left in a compressed state which might damage it. When using the E6 control unit, you can release the safety edge from compression. After the door has reached the closed position, the controller opens the door for a time defined by program board. The relief time is set with rotary switch **S401** according to the table below. If a service terminal has been connected to the unit, when rotating the switch the display shows the text "*R45*" and after that the relief time in seconds. When not using relief the rotary switch must leave to position 0.

When using relief, it must be observed that the door does not depart from the closed limit, if the closed position information or similar on the door goes to access control. In addition, when using electronic locking, the distance caused by the relief in the locking mechanism must be taken into account.

S401 POSITION	Relief Time [s]	S401 POSITION	Relief Time [s]
0	No Relief	8	0,05
1	0,015	9	0,055
2	0,02	A	0,075
3	0,025	B	0,1
4	0,03	C	0,5
5	0,035	D	1
6	0,04	E	2
7	0,045	F	5

9.5. SUPU BOARD E6-5-08

SUPU board E6-5-08 will be used in places where an opening door or similar can cause a pressing danger. SUPU board E6-5-08 is connected to a free bus terminal on board E6-2L according to the instruction given above. SUPU board cannot be used simultaneously with the load guard. Places 3, 4, 5 and 6 of the pin terminal J400 must be left in their factory settings, 4, 5 and 6 in the 'OFF' position and 3 in the 'ON' position. The 'OFF' position means that there is no short circuit plug and the 'ON' position that a short circuit has been installed.

As a pressure guard must be used a device from which will be received in the pressure situation an opening potential-free contact data. The opening contact is to be connected to the terminals 1 and 2 on the board E6-5-08. When the door is opening, the break contact of the pressure guard stops the door and closes it during the set time. The closing time is set by the rotary switch **S401** according to the table below.

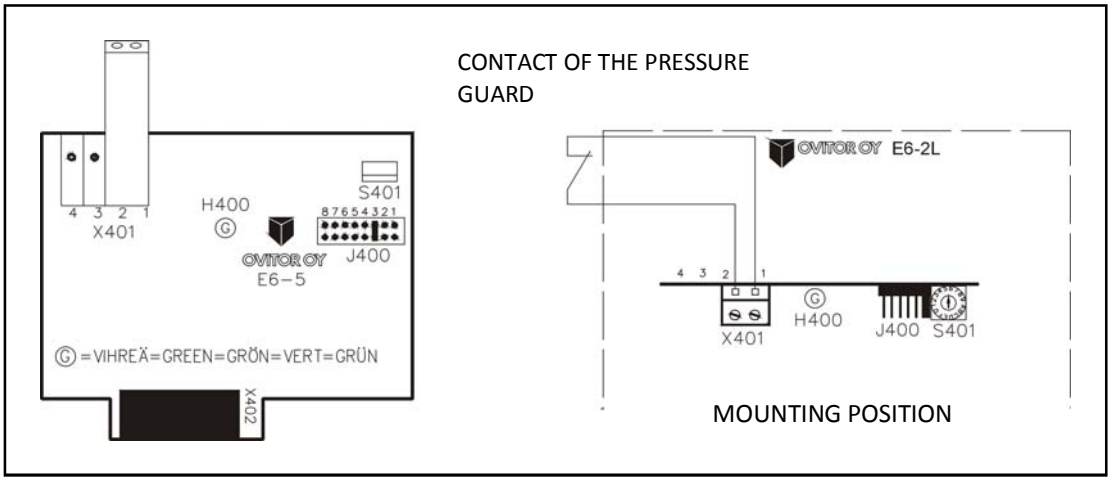


Fig. 17. SUPU board E6-5-08

S401 POSITION	Closing Time [s]	S401 POSITION	Closing Time [s]	S401 POSITION	Closing Time [s]
0	0	6	6	C	12
1	1	7	7	D	13
2	2	8	8	E	14
3	3	9	9	F	15
4	4	A	10		
5	5	B	11		

If the controller is equipped with service terminal E6-6-02/3E, the display shows, when the position of the rotary switch is changed, for a moment the text '*A140*' and after that the set time. If the pressure guard has stopped and closed the door during the set time, the display shows the error code "*E20*". Simultaneously, the red LED **H102** on board E6-2L will be flashing.

If any of following functions is effective, the door doesn't close, but remains in place:

- STOP circuit is broken,
- the beam of safety photocell is broken
- an obstacle breaks the beam of the safety photocell
- the door is on hold-to-run mode in the closing direction or
- OPEN impulse is coming from the opening drive.

The door will close during the set time, when the beam of safety photocell becomes solid or the open impulse quits. If the open impulse is on and the opening contact of the pressure guard has stopped the door, the door does not open immediately when the contact of the pressure guard will be closed, but the control needs a new open impulse. If the door closes under the control of pressure guard and hits a safety edge, the door will open. The control has rated the time the door was closing before the safety edge impulse. If the pressure guard indicates again, the door will close during a half of the rated time. If the safety edge sends a new impulse, the door will open. The control has rated the closing time again. If the pressure guard indicates again, the door will close during a half of the last rated time. The to-and-fro motion continues until the time will be zero.

10. SERVICE AND TROUBLESHOOTING

10.1. SERVICE TERMINAL E6-6-02/3E

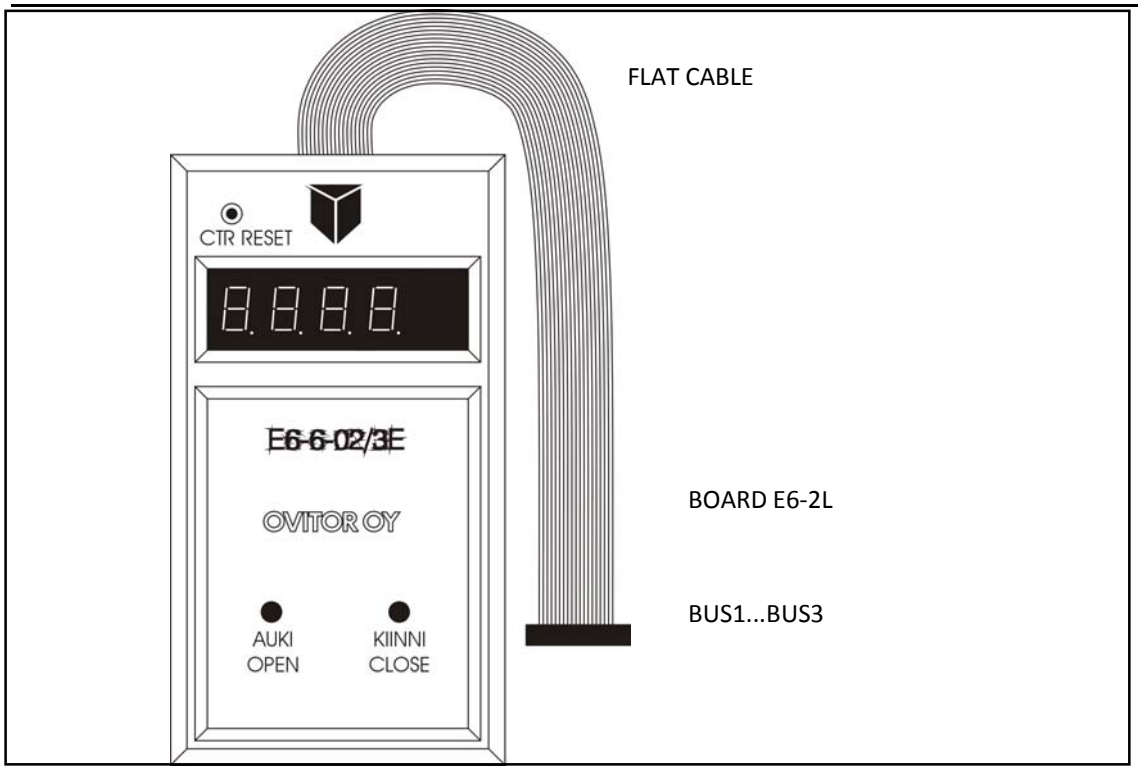


Fig. 18. Service Terminal E6-6-02/3E

The service terminal E6-6-02/3E is connected with the flat cable to the free BUS terminal of board E6-2L according to the instruction above. The connections must be made in dead state.

Normally, the service terminal display shows the service cycle counter of the door, indicating the number of openings of the door in decuple. The figure on the display increases by one after every tenth opening of the door. The service cycle counter is in the controller itself, and it functions always irrespective of whether the service terminal is connected or not; the service terminal only shows the reading of the counter. When the door receives an open or close impulse, the display shows, for a moment, the text '*OPEN*' or '*CLOSE*', according to the impulse. When the settings of the controller are changed, the display first shows, for a moment, in text form what is being changed and after that the set figure. With the open and close buttons on the service terminal, the door can be controlled in the same way as with the normal control push-buttons.

With the service terminal, the service cycle counter in the controller itself can be reset in the installation stage of the controller, or during servicing of the door. The service cycle counter in the controller is reset by first pressing the '**CTR RESET**' button above the display of the service terminal and then holding it down and simultaneously pressing the close button of the service terminal.

The display shows the 10 last alarms when CTR RESET button will be pushed and released. The alarms are shown starting from the oldest to the newest. If there is no malfunction in the memory location the display shows the message "*E50*". The fault memory will be reset with the service terminal. By pushing simultaneously the CTR RESET and OPEN buttons the memory will be reset and in memory locations the display shows the message"*E50*".

10.2. FAULT AND ERROR MESSAGES THROUGH SERVICE TERMINAL E6-6-02/3E

CONTROL VOLTAGE MALFUNCTION, 'E1'

If the +24 V control voltage drops below +18 V, the display shows the malfunction message '*E1*', and simultaneously the green LED H34 on the board E6-2L goes out. The message clears off when the voltage exceeds +18 V.

CONTROL VOLTAGE HAS BEEN CUT OFF FROM THE DRIVE UNIT WITH THE MANUAL USE DISENGAGEMENT LEVER OR WITH THE SELECTOR SWITCH, 'E3'

If the drive unit has been set on manual use with the disengagement lever or if the control voltage has been cut with the selector switch, the display shows the malfunction message '*E3*'. The message clears off when the disengagement micro-switch or the selector switch is returned to the normal position. The green LED **H37** on the board E6-2L also goes out for the same reason.

COLLISION IN CLOSING RUN, 'E4'

If the safety edge indicates an obstacle while the door is closing, the display shows the malfunction message '*E4*'. Simultaneously, the red LED **H102** on the board E6-2L lights up. If the load guard has reacted when the door is closing the display shows the malfunction message '*E4*'. Simultaneously, the red LED **H102** on the board E6-2L flashes at a rate of 2 seconds ON and 2 seconds OFF.

SAFETY EDGE TEST PULSE, 'E5'

If the testing of the safety edge has been defined in the controller and no pulse comes from the safety edge while the door closes against the floor or similar, the display shows the malfunction message '*E5*'. At the same time, the red LED **H104** on the board E6-2L lights up, and the control switches to hold-to-run mode in the closing direction. The error message clears off when a pulse from the safety edge is being received.

BY-PASS OF THE SAFETY EDGE DOES NOT WORK, 'E6'

The malfunction message '*E6*' means that the safety edge by-pass transistor constantly lets current run through or that the safety device limit has been adjusted or connected incorrectly. The controller has set the door on hold-to-run mode in the closing direction. Simultaneously the red LED **H104** on the board E6-2L will be flashing. The testing of the transistor takes place in the closing drive, beginning from the open limit and continuing as far as to the safety device limit. The error message clears off when the transistor stops conducting or the safety device limit is adjusted correctly.

EXCESS OF RUNNING TIME, 'E9'

If the maximum running time set in the controller has been exceeded and the door has not reached the limit position, the controller has stopped the door, and the service terminal shows the malfunction message '*E9*'. Simultaneously, the red LED **H103** on the board E6-2L is on. The error message clears off when the door is again driven to move.

THE DOOR HAS STOPPED AT POWER FAILURE, 'E12'

If power is cut from the controller in the middle of the movement of the door, the display shows, after the return of power, the malfunction message '*E12*'. The message clears off when the door is driven to move.

THE DOOR HAS STOPPED AT A CONTROL VOLTAGE MALFUNCTION, 'E13'

If there is a short break in the control voltage while the door is in motion, the door stops, and the display shows the malfunction message '*E13*'. The message clears off when the door is driven to move.

THE LOAD GUARD DOESN'T WORK, 'E15'

If the load guard does not give pulses of right length during the start-up delay, the door stops and changes to hold-to-run mode. The display shows the malfunction message '*E15*'. Simultaneously, the red LED **H103** on the board E6-2L flashes at a rate of 2 seconds ON and 2 seconds OFF.

10. SERVICE AND TROUBLESHOOTING

THE LOAD GUARD HAS STOPPED AN OPENING DOOR, 'E20'

If the load guard has stopped the opening door, the display will show the malfunction message '*E20*' . Simultaneously, the red LED **H102** on the board E6-2L will be flashing at a rate of 2 seconds ON and 2 seconds OFF. The message clears off, when the door is driven to open or close.

THE DOOR HAS BEEN STOPPED BY SWITCHING OFF THE CONTROL VOLTAGE, 'E21'

If the door is stopped in the middle of movement with the selector switch, through the manual use disengagement micro-switch, or if the automatic closing function is interrupted for the same reason, the display shows the malfunction message '*E21*'. The message clears off when the door is driven to move.

OPERATING TIME FOR LOCKING LATCH EXCEEDED, 'E22'

If the VPLV-board for the control of the locking latch is in operation and if the micro switch for the position of the latch has not connected the terminals 1 and 2 on the VPLV-board together soon enough before the door starts opening, so then the display will show the malfunction message '*E22*'. Simultaneously the red LED **H103** on the board E6-2L will be flashing. The message clears off, when the door is driven to open again.

AUTOMATIC CLOSING STOPPED AT IMPULSE FROM SAFETY DEVICE, 'E23'

If automatic closing has been inhibited through the program board and if to the terminals 46 and 47 has been connected another type of safety device, than a safety edge, and if the connected safety device has stopped and opened the closing door, so then automatic closing will be inhibited and the display will show the message '*E23*'. The message clears off, when the door is driven to move again. If automatic closing has been inhibited through the program board and if in addition to this inhibition, another safety device has not been connected and if then a normal safety edge stops and opens a closing door, so then the display will show the message '*E4*' like described for collision during closing run.

THE PHOTOCELL DID NOT PASS THE TEST, "E30"

If the safety photocell in the closed direction did not pass the test, error code "*E 30*" is displayed on the service terminal screen. Simultaneously, the red LED **H104** blinks rapidly on the board E6-2L and the control will change to hold-to-run mode in the closed direction. The error message disappears when the test is performed successfully.

DOOR LOAD HAS INCREASED OVER THE INTRODUCED LIMIT, "E 31"

If the load the door places on the gear changes enough from the originally set value that the set, permitted change values are surpassed, the service terminal display shows the error code, "*E 31*". Simultaneously, the red LED **H103** blinks rapidly on the E6-2L board, representing a door servicing request. At the same time, the door control will change to hold-to-run mode in the open and closed direction. In a situation like this, the load diagrams must not be re-run but **THE DOOR MUST BE SERVICED**. After the door has been serviced and checked, a new introduction run is performed which removes the error message.

HOLD-TO-RUN DUE TO MALFUNCTION, 'E96'

If the door is on hold-to-run due to a malfunction, the display shows the malfunction message '*E96*'. The door goes on hold-to-run mode, if the malfunction is '*E97*' or '*E98*', the malfunction messages of which have a higher priority than '*E96*'. The message clears off after the malfunction has ceased.

MALFUNCTION IN AN EXTRA DEVICE, 'E97'

If a device connected to extra device terminals BUS1, BUS2 or BUS3 is out of order or of a type unknown to the controller, the display shows the malfunction message '*E97*'. In this situation, the door is on hold-to-run mode in the opening and closing directions. Simultaneously, the green LED **H101** on the board E6-2L flashes. The display of the board may possibly not show any code, but instead, the fault can only be detected on LED H101 on the board E6-2L.

MALFUNCTION IN A CONTROL OR SAFETY DEVICE, 'E98'

If a control or safety device connected to terminals 8...56 rapidly alternates its mode of function on and off, the display shows the error message '*E98*'. The message clears off after the malfunction has ceased.

FAULT ON BOARD E6-2L, 'E99'

If the board E6-2L is able to indicate a fault in itself, the display shows the malfunction message '*E99*'. In such a case the board E6-2L must be repaired or replaced.

FAULT IN PERMANENT STORAGE AFTER POWER FAILURE, 'AE3'

If there is a fault in the permanent storage of board E6-2L after a power failure, the display shows the malfunction message '*AE3*'. In such a case the board E6-2L must be repaired or replaced.

DOOR HAS BEEN STOPPED WITH STOP BUTTON, 'STOP'

If the motion of the door is being stopped with the STOP button or if the automatic closing function is interrupted by pressing the STOP button, the display shows the malfunction message '*STOP*'. The message clears off when the door is driven to move.

INTRODUCTION RUN, "LEAR"

When performing an introduction run the display shows the message "*LEAR*". Simultaneously, the red LEDs **H103** and **H104** blink in turn on the board E6-2L. The error message disappears when the introduction run is performed successfully.

INTRODUCTION RUN WASN'T SUCCESSFUL, "LE1" AND "LE2"

When performing an introduction run of the power diagram without success the display shows the malfunction message "*LE1*" or "*LE2*". Simultaneously, the red LEDs **H103** and **H104** keep on flashing in turn on the board E6-2L. The message disappears after introduction run success.

10.3. FAULT TRACING INSTRUCTIONS

Check that the settings described in these instructions have been made in accordance with the type and mode of operation of the door in question and that extra devices have been connected in accordance with the drawings to terminals specifically reserved for them.

Check that the auxiliary voltages are in order:

- On board E6-2L, the green LED's **H100** and **H101** must be on, cf. drawing no. 340L. H100 indicates that +5 V is in order and H101 that the unit is ready for operation.
- On board E6-2L, the green LED **H34** must be on, indicating that the +24 V control voltage is in order.

THE DOOR OPENS, BUT DOES NOT CLOSE

If the door opens, but does not close:

- Check the operation of external safety devices. See the control voltage diagram, drawing no. 336L, and assess the passage of the closing drive voltage. The green led **H53**, last in the safety device circuit, should be on.
- Check that the door does not receive a continuous open instruction. The open instruction is indicated by the red LED's. See drawing no. 337L, which explains the different control instructions.
- If a constant closing command is given while the door is still in opening movement, the door will not close.

IF THE DOOR DOES NOT OPEN

If the door does not open, check that the opening command is received.

- See that the correct red LED corresponding to the open command turns on, when the opening instruction is given; cf. drawing no. 337L.
- Check that the green LED **H51** is on; cf. drawing no. 336L.
- Cf. drawing no. 336 on the passage of control voltages.

If, in spite of the above instructions, you cannot make the door function with the motor, remember that the door can nevertheless be made to operate manually, by turning the disengagement clutch lever of the drive unit counter-clockwise.

10. SERVICE AND TROUBLESHOOTING

10.4. LED'S INDICATING THE OPERATING MODE OF THE LIMITS

The green LED's **H49**...**H51** and **H53** indicate the operating mode of the limits; cf. drawing no. 336L. The drawing describes the position of the limit switches when the door is closed. The LED's of limits are on when the limit switch is not switched off. The function of LED's depends also on the state of regulating units connected before them in series.

10.5. SERVICE

If, in spite of the preceding instructions, you cannot make the door function, it is best to contact the dealer's service organisation before other actions, such as changing components.

Most malfunctions of electrically operated doors are related to the fixation and connections of peripheral and safety devices. As the control unit E6L is equipped with versatile systems indicating the mode of operation, the service can often give more detailed fault tracing and repairing instructions even by telephone.

When ordering a service man, always indicate precisely:

- the type marking of the control unit, the serial number or drawing number on the sticker in the control unit or in the drawing;
- your name and company etc. and your phone number;
- contact person on the site as well as an accurate street address and the contact person's phone number;
- invoicing address.

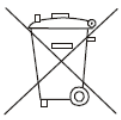
Indicating the order number or mark speeds up the preparation of the work order given to the service man as well as the servicing.

11. TECHNICAL DATA

Standard for production and installation	EN 60439-1:2005
Type of current	AC 50Hz
Number of poles	5
Rated voltage Un	400V/230V +6%...-10%
Rated insulation voltage Ui	400V
Control Voltage	24VDC
Rated current In	6A
Input fuse	max. 3x10A in a circuit board version
Short-circuit protection for transformer	2x315 mA rapid glass tube fuse 5x20mm
Overload protection/ control fuse for transformer	1 A rapid glass tube fuse 5x20mm
Resistance against short circuit ICW	< 10kA
Encapsulation class	IP54 normal version
Protection against electric shock:	
Control Unit Protection class II, normal version	
System	Protection class I, normal version
EMC operation environment	A and B
Distribution system	TN-S normal version
Dimensions (hxwxd)	290x280x170 mm, included in the length is the cable gland flange and in the height the mains switch, normal version
Weight	3,4 kg normal version

Disposal

Waste electrical products and batteries should not be disposed of with household waste!



Disposal should be carried out according to DIRECTIVE 2002/96/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 on waste electrical and electronic equipment and DIRECTIVE 2006/66/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 6 September 2006 on batteries and accumulators.

12. DECLARATION OF INCORPORATION OF PARTLY COMPLETED MACHINERY

Ovitor Oy
Sienitie 24
00760 Helsinki
Finland

Description and identification of the partly completed machinery:
Control unit E6/2L

The essential requirements of EC Machinery Directive 2006/42/EC have been applied and fulfilled for the above mentioned machinery to be used with industrial doors, gates and barriers.

The relevant technical documentation has been compiled in accordance with Annex VII, Part B of EC Machinery Directive 2006/42/EC.

In addition the partly completed machinery is in conformity with the EC 2006/95/EC
Low Voltage Directive LVD, 2004/108/EC Electromagnetic Compatibility EMC and 2002/95/EC the Restriction of the use of certain Hazardous Substances in Electrical and Electronic Equipment RoHS.

The above listed products are delivered according to the following standards to the extent to which they may be applicable:

EN ISO 12100-1, EN ISO 12100-2, EN 60204-1+A1, EN 60335-1, EN-55014-1, EN 61000-3-2, EN 61000-3-3, EN61000-6-2, EN61000-6-3, EN 60439-1+A1, EN 60439-3+A1+A2, EN 60529, EN 13241-1, EN 60355-1, EN 60335-2-103, EN 12453, EN 12445, EN 12978

SFS-Inspecta Sertifiointi OY has issued a certificate ascertaining that the manufacturer's quality system meets the requirements of standard SFS-EN ISO 9001:2008 and the general guidelines ABC 200, certificate 1229-04.

We undertake, in response to a reasoned request, to supply it *in electronic form* to the market surveillance authorities within a reasonable period.
The party authorized to compile the technical documentation is:

Ovitor Oy / Engineering Manager
Sienitie 24
00760 Helsinki
Finland

The devices are not intended to function independently but as part of an electrically operated machine.
As regards the installation, settings and servicing of the of the machinery, the instructions issued by us for the type of installation in question must be observed.

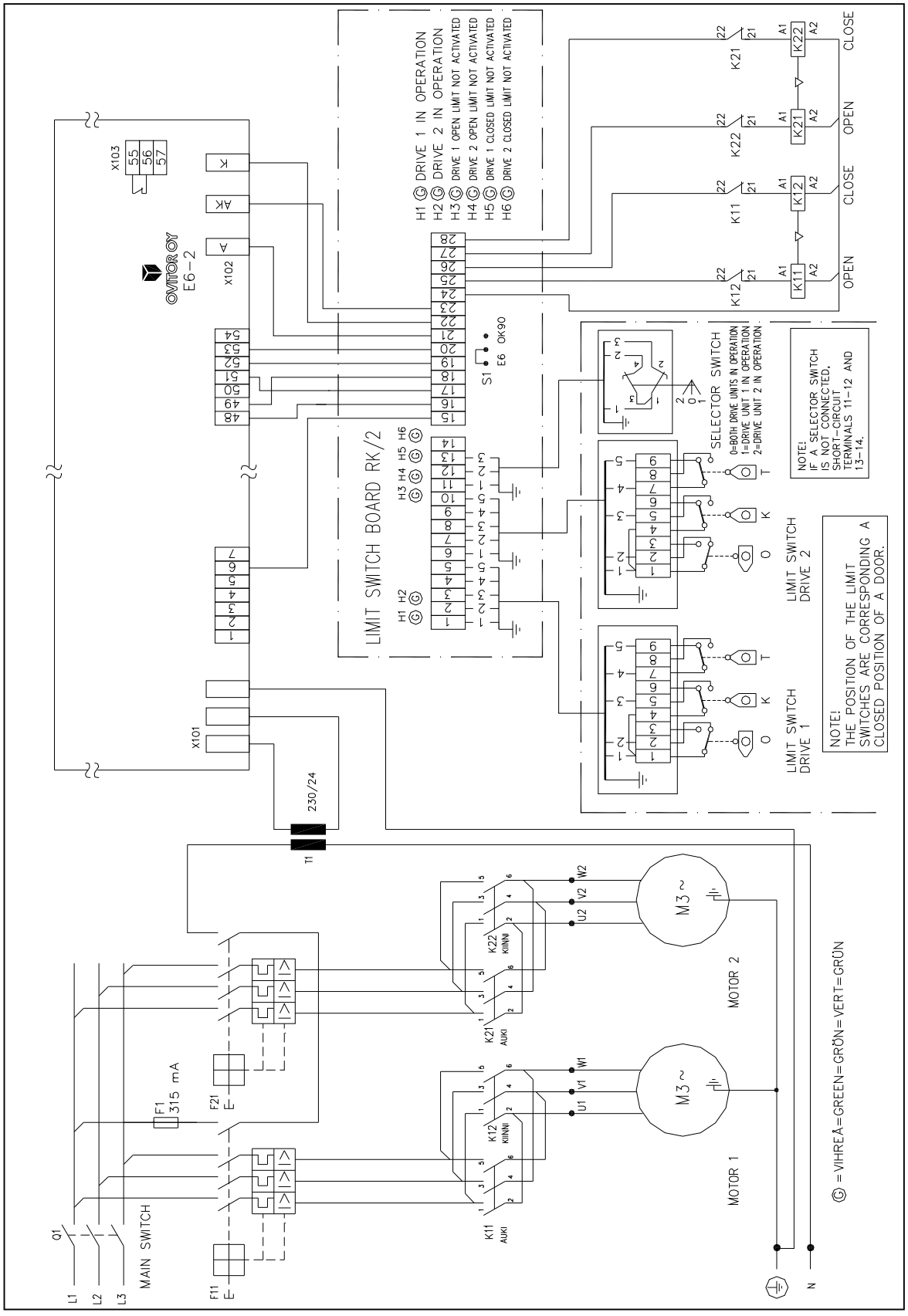
The partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the Machinery Directive.

Helsinki, 16th of June 2010

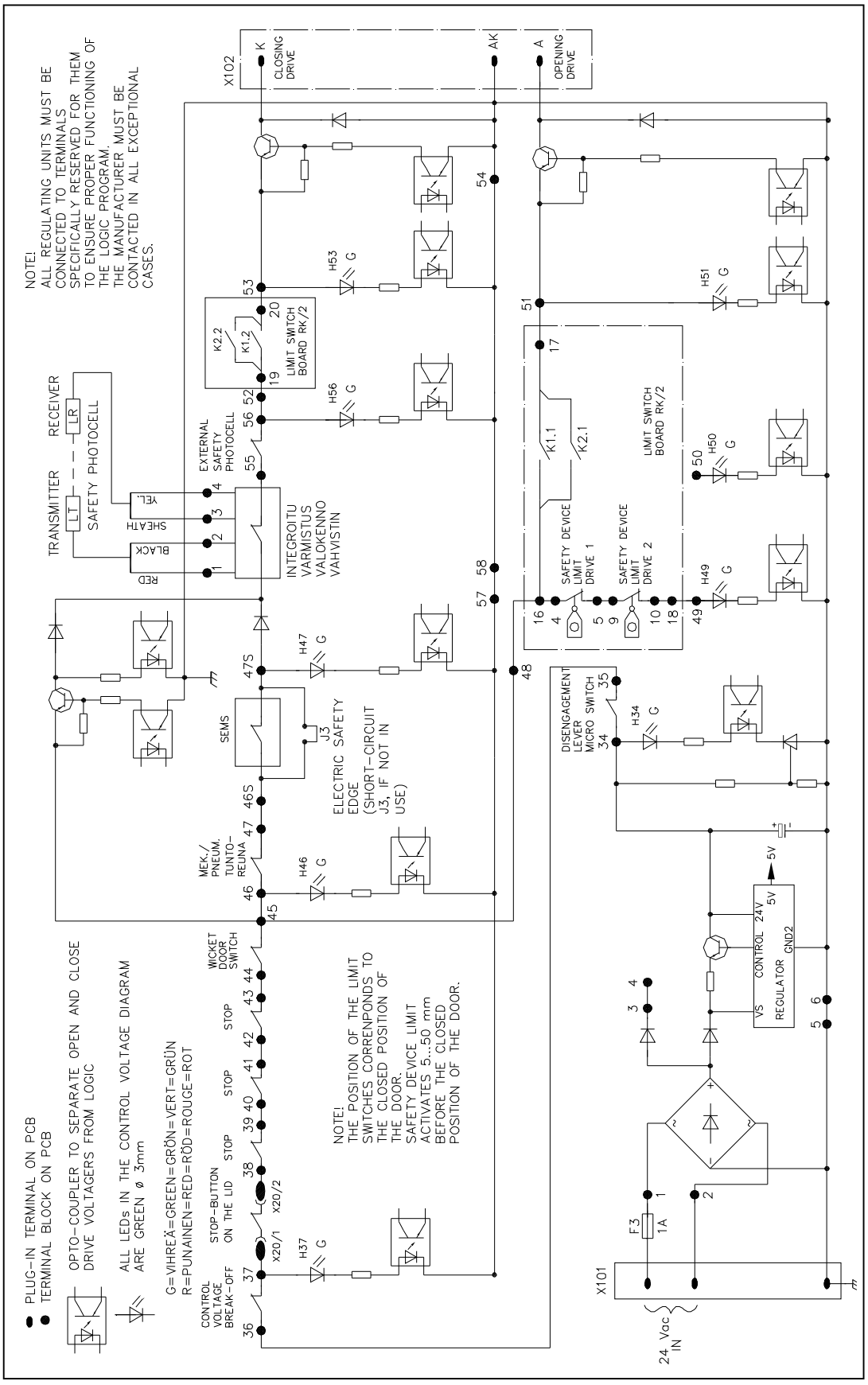
_____
Hannu Pyrhönen
Managing Director
Ovitor Oy

SERTIFIOITU SFS-inspecta ORGANISAATIO ISO 9001

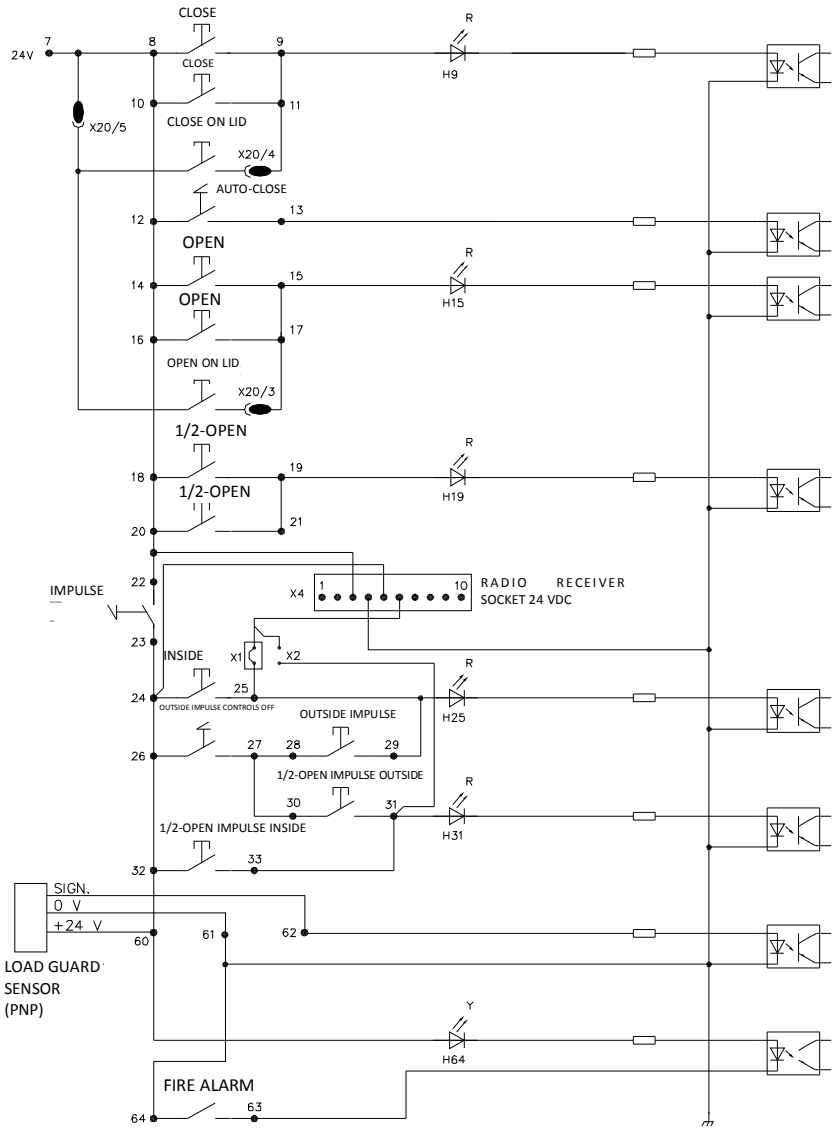
13. WIRING DIAGRAM OF POWER SECTION AND LIMIT SWITHCES DRAW. NO.:354L



14. CONTROL CIRCUIT DIAGRAM FOR OPEN AND CLOSE DRIVE VOL. DRAW. NO.:355L


NOTE!
ALL REGULATING UNITS MUST BE CONNECTED TO TERMINALS SPECIFICALLY RESERVED FOR THEM TO ENSURE PROPER FUNCTIONING OF THE LOGIC PROGRAM.
THE MANUFACTURER MUST BE CONTACTED IN ALL EXCEPTIONAL CASES.
X102
CLOSING DRIVE
OPENING DRIVE
TRANSMITTER
RECEIVER
SAFETY PHOTOCELL
EXTERNAL SAFETY PHOTOCELL
INTEGROITU VARMISTUS VALOKENNO VAHVISTIN
LIMIT SWITCH BOARD RK/2
SAFETY DEVICE LIMIT DRIVE 1
SAFETY DEVICE LIMIT DRIVE 2
DISENGAGEMENT LEVER MICRO SWITCH
SEMS
ELECTRIC SAFETY EDGE (SHORT-CIRCUIT J3, IF NOT IN USE)
MEK./PNEUM. TUNTO-REUNA
WICKET DOOR SWITCH
STOP-BUTTON ON THE LID
CONTROL VOLTAGE BREAK-OFF
NOTE!
THE POSITION OF THE LIMIT SWITCHES CORRENPONDS TO THE CLOSED POSITION OF THE DOOR.
SAFETY DEVICE LIMIT ACTIVATES 5...50 mm BEFORE THE CLOSED POSITION OF THE DOOR.
PLUG-IN TERMINAL ON PCB
TERMINAL BLOCK ON PCB
OPTO-COUPLER TO SEPARATE OPEN AND CLOSE DRIVE VOLTAGERS FROM LOGIC
ALL LEDs IN THE CONTROL VOLTAGE DIAGRAM ARE GREEN ø 3mm
G=VIHREÄ=GREEN=GRÖN=VERT=GRÜN
R=PUNAINEN=RED=RÖD=ROUGE=ROT
F3 1A
X101
24 Vac IN
VS CONTROL 24V 5V
REGULATOR GND2

15. WIRING DIAGRAM OF POWER SECTION AND LIMIT SWITHCES DRAW. NO.:337L



X1 SHORT CIRCUIT PLUG
RADIO CONTROL FOR FULL OPENING

X2 SHORT CIRCUIT PLUG
RADIO CONTROL FOR REDUCED OPENING

● TERMINAL BLOCK ON PRINTED CIRCUIT BOARD

OPTO-COUPLER TO SEPARATE CONTROL VOLTAGE FROM LOGIC

G=VIHREÄ=GREEN=GRÖN=VERT=GRÜN
R=PUNAINEN=RED=RÖD=ROUGE=ROT
Y=KELTAINEN=YELLOW=GUL=JAUNE=GELB

NOTE! ALL REGULATING UNITS MUST BE CONNECTED TO TERMINALS SPECIFICALLY RESERVED FOR THEM TO ENSURE THE PROPER FUNCTIONING OF THE LOGIC PROGRAM. THE MANUFACTURER MUST BE CONTACTED IN ALL EXCEPTIONAL CASES.

S131 DIP SELECTOR SWITCH
S132 RUNNING TIME SET
S133 AUTOMATIC CLOSING TIME SET
S5 START BUTTON FOR INTRODUCTION RUN
S8 PROGRAMMING BUTTON

S131 DIP-SWITCHES:

1 ON=SINGLE BUTTON CONTROL OPEN/CLOSES
OFF=SINGLE BUTTON CONTROL ONLY OPENS
2 ON=SINGLE BUTTON STOP
OFF=NO SINGLE BUTTON STOP
3 ON=SAFETY EDGE TESTING
OFF=NO SAFETY EDGE TESTING
4 ON=FOLDING DOOR SAFETY EDGE COLLIDE
OFF=FOLDING DOOR SAFETY EDGES DON'T COLLIDE

X14 SOCKET FOR MEMORY CARD
X15 TERMINAL FOR PROGRAMMING
X20 TERMINAL FOR BUTTONS ON THE LID

R308 ADJUSTMENT OF AMPLIFICATION (PHOTOC.)

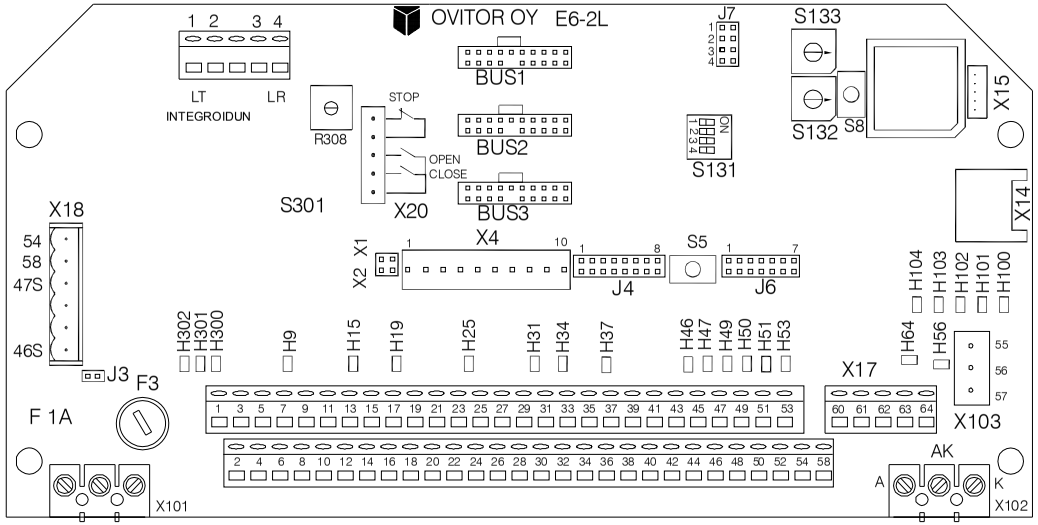
X4 SOCKET FOR RADIO RECEIVER

TERMINALS 1 AND 2: 24 VAC OUT
TERMINALS 3 AND 4: 24 VDC OUT, TERMINALS 5 AND 6: ZERO POTENTIAL SEE DWG. 336L; FULL WAVE RECTIFICATION
TERMINAL 7: 24 VDC OUT, REGULATED
TERMINALS 1,2,3,4 AND 7: LOAD FOR EXTERNAL DEVICES MAX 600 mA

TERMINALS 5,6,54,57 AND 58 ARE IN ZERO POTENTIAL OF THE 24 VDC ELECTRONIC VOLTAGE

TERMINALS 48-53: LIMIT SWITCHES

TERMINALS 55 AND 56: SAFETY PHOTOCELL AMPLIFIER BOARD E6-4 OR EU2-4



Jumper: (NOTE! "EK"= Not in use in E6/2L)

J3		ON= Electronic safety edge NOT in use	OFF= Electronic safety edge	page 9
J4	1	ON= inverter use	OFF= inverter NOT in use	EK
	2	ON= load guard sens. in open d. 8%	OFF= load guard sens. in open d. 5%	EK
	3	ON= load guard sens. in closed d. 6%	OFF= load guard sens. in closed d. 3%	EK
	4	ON= Start-up delay 1s	OFF= Start-up delay 0,8s	EK
	5	ON= Load change 10%	OFF= Load change 6%	EK
	6	ON= Closing Time 6s (J4/7 ON)	OFF= Closing Time 0s (J4/7 OFF)	EK
	7	ON= Closing Time 1s (J4/6 OFF)	OFF= Closing Time 2s (J4/6 ON)	EK
	8	ON= Lengthened open time 90...3600 s	OFF= Open time 0...60 s	page 6
J6	1	ON= Load guard NOT in use	OFF= Load guard in use	EK
	2	ON= Deadman mode in open direction	OFF= Impulse	page 6
	3	ON= Deadman mode in closed direction	OFF= Impulse	page 6
	4	ON= Integrated photocell NOT in use	OFF= Integrated photocell in use	page 11
	5	ON= Option	OFF= Option	
	6	ON= NO photocell testing	OFF= Photocell testing	page 11
	7	ON= Normal use	OFF= Fire door use	page 36
X1		ON= Radio control for full opening		page 8
X2		ON= Radio control for 1/2-opening		page 8
S301		ON= Photocell ampl., wide doorway	OFF= Narrow doorway	page 12
J7	1	ON= Single button control		page 8
	2	ON= Auto close from fully open pos.	OFF= Normal function	page 6
	3	ON= Auto close from half-open pos.	OFF= Normal function	page 6
	4	ON= Load guard sens. open/closed dir.	OFF= Load guard sens. o/c dir.	EK

LED:

H9 CLOSE DRIVE
H15 OPEN DRIVE
H19 1/2-OPEN DRIVE
H25 IMPULSE CONTROL FULL OPEN
H31 IMPULSE CONTROL 1/2-OPEN
H34 SAFETY CIRCUIT CONTROL VOLTAGE
H37 CONTROL VOLTAGE BREAK-OFF
H46 STOP CIRCUITS IN TACT
H47 SAFETY EDGE
H49 SAFETY DEVICE LIMIT
H50 1/2-OPEN LIMIT
H51 OPEN LIMIT
H53 CLOSED LIMIT
H56 SAFETY PHOTOCELL
H64 FIRE ALARM (YELLOW)
H100 +5 V CONTROL VOLTAGE OK
H101 CONTROL UNIT IN ORDER FOR OPERATION
H102 FAULT ALARM, SEE MANUAL
H103 FAULT ALARM, SEE MANUAL
H104 FAULT ALARM, SEE MA NUAL

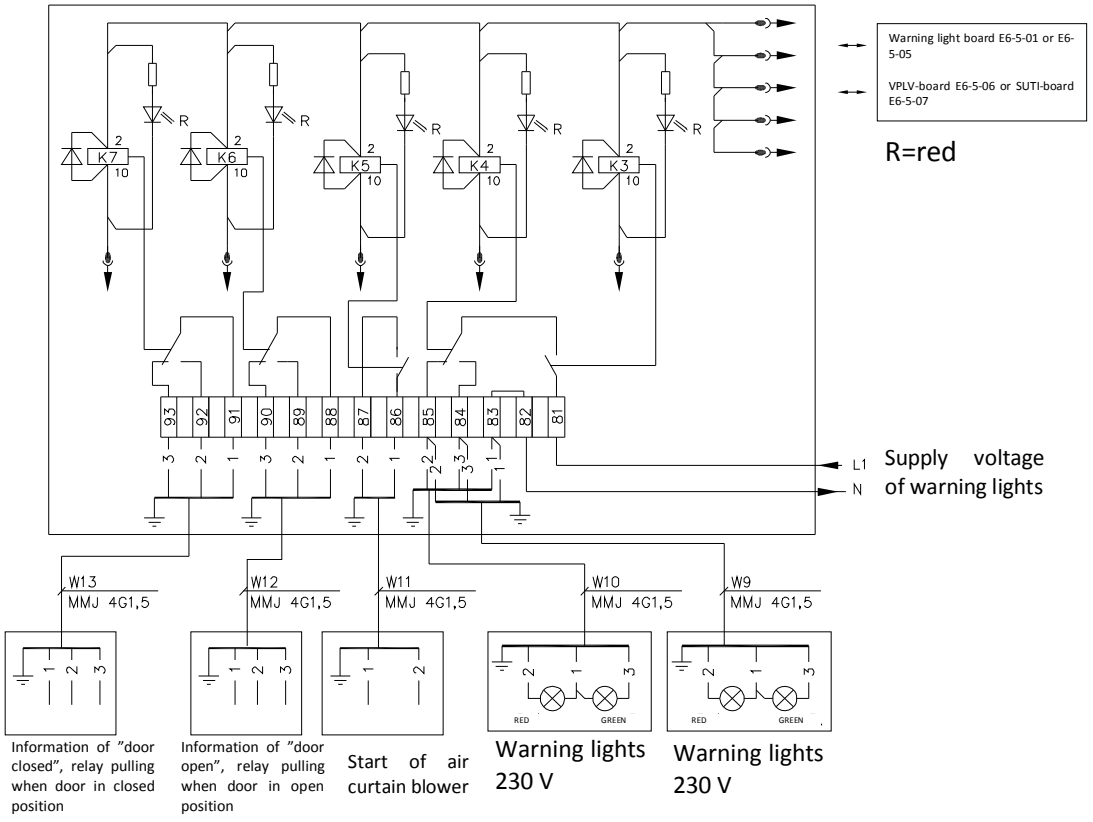
INTEGRATED PHOTOCELL AMPLIFIER

H300 LIGHT BEAM INTACT
H301 AMPLIFIER HAS OPERATING VOLTAGE
H302 AMPLIFIER CONDUCTS

H9-H31,H102-H104	RED
H34-H56,H100,H101,H300-H302	GREEN
H64	YELLOW

17. CONTROL BOARDS CON3 AND CON4, CONNECTION DIAGRAM DRAW. NO.:355L

CONTROL BOARD CON3



Warning light board E6-5-01 or E6-5-05

VPLV-board E6-5-06 or SUTI-board E6-5-07

R=red

Supply voltage of warning lights

Information of "door closed", relay pulling when door in closed position

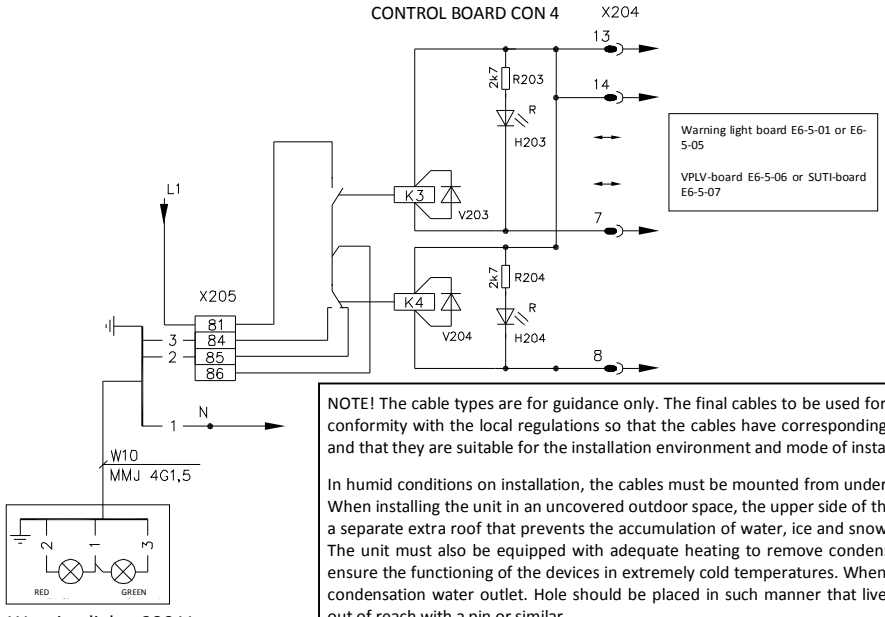
Information of "door open", relay pulling when door in open position

Start of air curtain blower

Warning lights 230 V

Warning lights 230 V

CONTROL BOARD CON 4



Warning light board E6-5-01 or E6-5-05

VPLV-board E6-5-06 or SUTI-board E6-5-07

Warning lights 230 V

NOTE! The cable types are for guidance only. The final cables to be used for the installation have to be in conformity with the local regulations so that the cables have corresponding cross-sectional surface areas and that they are suitable for the installation environment and mode of installation in question.

In humid conditions on installation, the cables must be mounted from underneath through sealing glands. When installing the unit in an uncovered outdoor space, the upper side of the unit must be equipped with a separate extra roof that prevents the accumulation of water, ice and snow on the roof of the unit itself. The unit must also be equipped with adequate heating to remove condensation water damages and to ensure the functioning of the devices in extremely cold temperatures. When necessary drill 3 mm hole for condensation water outlet. Hole should be placed in such manner that live parts of the control unit are out of reach with a pin or similar.

In unclear situations, please contact OVITOR OY

18. LIMIT SWITCH BOARD CONNECTION DIAGRAM DRAW. NO.:353L